The Architecture of the Red Monastery Church (Dayr Anbā Bišūy) in Egypt

An Evolving Anatomy

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General surveys of early Byzantine architecture make little or no mention of the church of the Red Monastery, located to the west of the city of Sūhāǧ in Upper Egypt.[1] The fundamental importance of this building has hitherto been recognized by only a relatively small number of architectural historians who have visited the site. For them, the sanctuary of the church and its facade rank among the "supreme architectonic achievements" of early Christian Egypt (fig. 1).[2] Although the state of preservation of the sanctuary is little short of miraculous, the same cannot be said for the rest of the structure of the church, whose ruined condition makes it difficult to imagine its appearance over time. With the elapse of more than fourteen centuries since it was first built, it is no surprise that the complex should have sustained considerable physical damage, through natural disaster or the processes of decay. This is immediately apparent to anyone entering the large vacant space formerly occupied by the nave, whose pockmarked walls bear witness to profound historical change (fig. 2). Extensive restorations have further modified many parts of the building, thus creating a complex stratigraphy that requires detailed analysis before any conclusions can be reached. This article attempts to provide such an interpretative study.

Over the past one hundred twenty years, a number of architects have tried to reconstruct on paper the earliest appearance of the church. There is debate as to when, exactly, the foundation took place but it seems likely to have occurred between the mid-fifth and mid-sixth centuries. In the absence of conclusive textual evidence, this dating relies on typological comparisons and analyses of surviving sculptural decoration at the church.[3] The focuses of all reconstruction attempts have been the missing structure of the nave, its connection with the sanctuary facade, and the method of roofing the sanctuary. The English antiquarian and conservation architect Somers Clarke (1841–1926) was the first to address these issues comprehensively in his many unpublished field notebooks compiled between 1895 and 1911.[4] He summarized these observations in

1 The monastery was originally dedicated to the memory of the fourth-century ascetic Bishoi [Pshoi], but in the 1990s the church was additionally dedicated to his contemporary Bigol [Pcol]. For these saints see S. Emmel and B. Layton, "Pshoi and the Early History of the Red Monastery," in *The Red Monastery Church: Beauty and Asceticism in Upper Egypt*, ed. E. S. Bolman (New Haven, 2016), 11–16. "Red," apparently denoting the color of the bricks used in its construction, was applied to the monastery by the historian al-Maqrizi in the fifteenth century and has now become its common descriptor.

2 A phrase employed by U. Monneret de Villard, *Les couvents près de Sohâg (Deyr el-Abiad et Deyr el-Ahmar)*, 2 vols. (Milan, 1925–26), 1:9.

3 H.-G. Severin, "On the Architectural Decoration and Dating of the Church of Dayr Anbā Bīšūy ('Red Monastery') near Sūhāǧ in Upper Egypt," *DOP* 62 (2008): 110–11, has proposed the sixth century. D. Kinney, "Architectural Sculpture," in Bolman, *Red Monastery Church*, questions this and attributes the construction to the end of the fifth century.

4 University of Oxford, Griffith Institute, Clarke Archive, Notebooks B, G, and Q.

FIG. 1. The interior of the late antique sanctuary of the Red Monastery church after conservation, 2014 (photo: Pedro Gomez)

his 1912 book, *Christian Antiquities of the Nile Valley*.[5] After Clarke came the Italian polymath Ugo Monneret de Villard (1881–1954). He devoted an entire monograph to the Red Monastery church and its larger neighbor at the White Monastery (Dayr Anbā Šinūda), published in two volumes in 1925 and 1926.[6] After a team from the Darmstadt Technical University completed the first detailed architectural survey of the complex in 1962, Hans-Gerhard Evers and Rolf Romero presented their theories in 1964.[7] Finally, the doyen of Christian architecture in Egypt, Peter Grossmann, has given us two alternative reconstructions, published in 1969 and 2006.[8]

Considering the amount of ink already spilled in the cause of an architectural restitution of the church, it may be justifiable to ask why further discussion is needed. The answer to this question lies in the fact that, over the period 2003–2014, a conservation project was carried out at the church focusing primarily on its remarkable wall paintings.[9] This project was the first significant conservation intervention to take place at the site since the Comité de Conservation des Monuments de l'Art Arabe (henceforth Comité) undertook major structural restorations at the east

5 S. Clarke, *Christian Antiquities in the Nile Valley: A Contribution towards the Study of the Ancient Churches* (Oxford, 1912), 161–71.

6 See n. 2.

7 H.-G. Evers and R. Romero, "Rotes und Weisses Kloster bei Sohag; Probleme der Rekonstruktion," in *Christentum am Nil: Internationale Arbeitstagung zur Ausstellung "Koptische Kunst," Essen, Villa Hügel, 23.–25. Juli 1963*, ed. K. Wessel (Recklinghausen, 1964), 175–94.

8 P. Grossmann, "Die von Somers Clarke in Ober-Anṣinā entdeckten Kirchenbauten," *MDAIK* 24 (1969): 144–68; idem, "Zum Dach über dem Ostumgang der Kirche des Bishuyklosters bei Sūhāǧ," *Eastern Christian Art* 3 (2006): 37–46.

9 The project was directed by Elizabeth S. Bolman, funded by a grant from the United States Agency for International Development, and administered by the American Research Center in Egypt.

FIG. 2.
The inner north wall of the Red Monastery church, 2011, showing the north portal, beam holes for the destroyed timber superstructure of the nave, and modern repairs (photo: author)

end of the nave and in the sanctuary between 1909 and 1912.[10] It revealed a number of new features in the architecture of the building that challenge some previous assumptions about the chronology of its construction and its probable appearance at different periods in its development. As a result, the analysis presented here draws upon the earlier commentaries, but also proposes the case for a later dating of the enclosure wall of the church as well as alternative theories concerning the original relationship between the nave and the sanctuary and the method of their roofing.

Any architectural reconstruction of the building must account for the activities that it once framed. Such an account must go beyond the functions of the liturgy[11] to include questions of where other devotional acts were performed within the church (and whether they were cyclical or exceptional), and exactly who was permitted access to different parts of the building (taking into consideration sex, age, and status within both monastic and civil hierarchies). Common features such

10 For the extent of the work carried out by the Comité, see N. Warner and C. Meurice, "The Comité: Conserving the Red Monastery Church in the Early Twentieth Century," in Bolman, *Red Monastery Church*, 243–60.

11 See U. Zanetti and S. J. Davis, "Liturgy and Ritual Practice in the Shenoutean Federation," in Bolman, *Red Monastery Church*, 27–36.

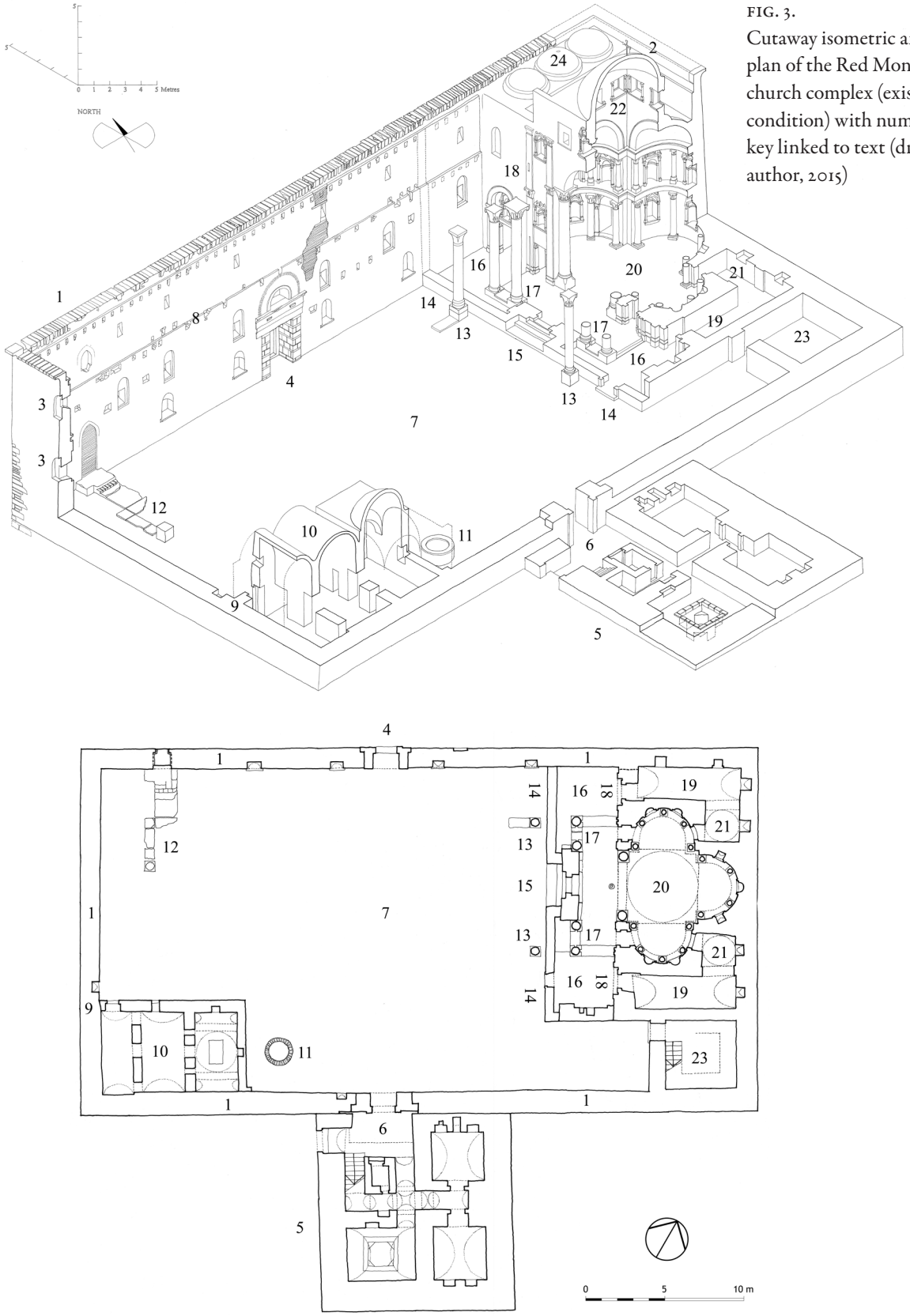


FIG. 3.
Cutaway isometric and plan of the Red Monastery church complex (existing condition) with numerical key linked to text (drawing: author, 2015)

as a baptistery or library are today absent at the Red Monastery church. Whether this was the case historically cannot be determined. As the neighboring White Monastery is, by consensus, considered to be the architectural parent of the much smaller Red Monastery, and was moreover the center of a local federation of monasteries, perhaps there was no need to replicate elements already present in the parent church. With the passage of time, changes in use or religious practice likely occurred, with significant consequences for the architecture of the building. These changes, though difficult to quantify with certainty today, will be mentioned where relevant to the understanding of the physical remains. A complete reconstruction of the life of the church is, however, well beyond the scope of this article, as are considerations of how it was furnished.

Architectural Description

The surviving architecture of the church has been extensively discussed elsewhere.[12] A summary description of the complex is repeated here, however, as the present fabric is the primary source for the architectural reconstruction that follows. This should be read with reference to the cutaway isometric and plan of the building in its present condition, with numbers in square parentheses corresponding to those in figure 3.

The exterior of the church takes the form of an oblong box of fired brick masonry, measuring 43 × 23 meters in plan, which follows an approximate rather than exact east–west orientation. The box has gently tapering walls that rise to a height of eleven meters, capped by a cavetto cornice of limestone [1]. At the east end of the building, a dome rises above the line of the cornice, indicating the location of the sanctuary within [2]. Two horizontal lines of recessed window openings puncture the walls on all sides [3]. Many of these windows are blank, and are therefore part of a carefully designed facade treatment. Though modern repointing has obscured their crispness, it is clear that pointed arches frame all the windows of the lower tier. An elaborately carved limestone portal [4] is set into the approximate center of the north elevation. A square tower (or keep), matching the height and method of construction of the exterior walls, stands in front of the center of the south facade [5]. The tower is 12.5 meters square in plan, and has a small entrance on its west face. Passing through this door, the visitor is confronted by a second limestone portal, carved in the same manner as that on the north facade but with more richness and complexity, indicating its greater hierarchical importance [6]. Both stone portals follow the identical taper used for the outer face of the masonry of the perimeter walls. Entering by either portal, the visitor arrives in a large empty space [7].[13] The walls enclosing this space bear many signs of the structures that once abutted them, in the form of beam holes and masonry scars [8]. One such scar [9], running the full height of the building, can be seen on the inner west wall above a small domed church that occupies the southwest corner of the enclosure [10]. This scar indicates that a wall once subdivided the empty zone into two separate areas of unequal size: the nave of the 'original' church and a long hall to its south. To the east of the small church is a well [11].

Stone architectural fragments, including two complete granite column shafts and carved limestone cornice blocks, lie on the ground. Three limestone column bases linked by a series of stone blocks of the same width (a kind of stylobate) survive in situ at the northwest corner of the space [12], associated with steps up to a blocked doorway in the north wall. This door also has a pointed arch. Two more complete column assemblies (with limestone bases and capitals and granite shafts of different colors) stand at the east end [13] in front of a modern plastered wall [14], which today encloses the sanctuary of the church. The bases, the blocks that link them, and the columns are the only traces of the north and west aisles of the nave of the church (the south aisle being entirely missing). In a recess at the center of the modern wall sits an older trilobed brick portal incorporating various spoliated carved limestone blocks [15].

A small door to the south of the trilobed portal gives access to a rectangular enclosed space that runs north–south with a modern timber roof [16]. A raised platform, or bema, reached by two stone steps,

12 N. Warner, "Architectural Survey" and D. Kinney, "The Type of the Triconch Basilica," both in Bolman, *Red Monastery Church*, 49–78 and 37–48 respectively.

13 In the fall of 2015, the nave was paved with limestone and a group of (mostly fragmentary) column shafts were reerected on new limestone bases at its west end. This work was carried out at the commencement of a new conservation project at the church focusing on elements outside the sanctuary. Like its predecessor, the project was funded by the United States Agency for International Development and administered by the American Research Center in Egypt.

occupies the center of the space directly to the west of the sanctuary. On the west side of the bema stand four columns [17], the central pair taller than the outermost. Three of these columns have original carved Corinthian-type limestone capitals, and the other a simplified capital installed in 1909. A sanctuary facade wall of ashlar limestone masonry stands on the east side of the space, covered in parts with painted plaster [18]. This facade is a symmetrical composition, divided horizontally by wooden bands that are set into the face of the masonry, and vertically by pilasters. Niches of varying designs placed at different heights provide depth to the facade. At the center of the wall is a large semicircular limestone arch, which springs from two colossal granite columns with limestone capitals. This frames the entrance to the sanctuary proper, but there are also other openings in the facade wall. At its northern and southern ends, doors placed within semicircular arched recesses lead to vaulted rectangular side chambers [19], and immediately to either side of the central arch there are two small doors that pass through the thickness of the facade wall into the sanctuary [20].

The sanctuary itself is a dynamic space, full of architectural movement. Its form is that of a triconch with three arched conches or apses with large semidomes that match the height of the arch in the facade wall. Two tiers of columns and niches line each conch. The lower tiers of the north and south conches also contain two doors apiece: one leading from the bema in front of the sanctuary and one leading to small domed side chambers to the east [21], which connect with the rectangular rooms that occupy the space in plan to either side of the sanctuary. The number and arrangement of columns and niches in the north and south conches differs from that of the east conch. In the upper tier of each conch smaller columns are placed above those at ground level, separated from them by a simple entablature. The design of the niches (both in horizontal section and elevation) and of their pediments, together with the pediments over the doors, provides considerable variety in the modeling of the conches. At high level, a modern dome [2] covers the sanctuary, rising above a square clerestory "lantern" with three windows on each side framed by miniature columns or pilasters [22]. A modern staircase in the southeast corner of the enclosure [23] leads to the roof level, where a series of three small modern domes occupy the opposite northeast corner [24].

There are a number of salient points to highlight in this intentionally sparse description, and these will be discussed in greater detail below. They are: the appearance of the brickwork, the spatial division of the empty enclosure that was once occupied by the nave and other structures, the later transformations at the east end of the church affecting one's perception of the sanctuary facade, and the modern dome above the sanctuary. First, however, I will attempt to fit these pieces, many of which date to different phases of work, into a possible sequence of construction.

Toward a Chronology

Commentators have offered three different opinions concerning the dates of the major structural elements of the Red Monastery church. These are (1) that the triconch sanctuary and its facade were built in late antiquity as a freestanding church without an attached basilica,[14] (2) that the sanctuary, its facade, and the brick perimeter walls we see today were built together in the fifth or sixth centuries,[15] and (3) that the sanctuary is late antique but the outer walls are a medieval reconstruction of a late antique enclosure.[16] Let us consider these suggestions in sequence. From a practical point of view, it is hard to imagine how the facade of the sanctuary could ever have been anything other than internal, enclosed by a larger building that would have protected it (and the sanctuary itself) from direct exposure to the harsh desert environment. The second proposition can now be rejected for reasons revealed by recent conservation work that are discussed below. A reappraisal of the physical evidence does, however, sustain the third alternative: that the external walls of the church are indeed medieval.

A close inspection of the painted plaster layers on the sanctuary facade, as well as inside the side chamber to the north of the triconch, reveals that the enclosure

14 P. Grossmann, *Christliche Architektur in Ägypten* (Leiden, 2002), 538.

15 P. Grossmann, "Dayr Anba Bishoi (Suhaj): Buildings," *Coptic Encyclopedia* 3 (New York, 1991), 740, suggests that both the nave and the outer walls can be dated to the end of the fifth or beginning of the sixth century and dates the tower to the ninth century. Severin, "On the Architectural Decoration" (n. 3 above), 108–9, dates both the walls and the sanctuary together to the mid-sixth century.

16 H.-G. Severin, "Dayr Anba Bishoi (Suhaj): Architectural Sculpture," *Coptic Encyclopedia*, 3:739.

FIG. 4.
View of north long side chamber looking west, 2012, showing late antique paintings on south wall, medieval paintings on west wall, reconstructed elliptical vault, and break in the end wall between first- and second-phase construction (photo: A. Vescovo, courtesy of the American Research Center in Egypt)

walls and the triconch were constructed at significantly different times (fig. 4). Late antique paintings from the earliest phases of decoration at the church survive on the south wall of the north side chamber, whereas the opposite wall has no paintings—only a medieval inscription from 1301 (see below). At the west end of the same room, a break extends through the masonry of the wall into the northern end of the sanctuary facade. On the facade, there is a major discrepancy in the number of plaster layers to either side of this break, with more layers covering the southern section of wall.[17] The northern part of this wall, as well as the inner face of the north and west walls of the nave, has only one layer of plaster. This is attributable to a single, later, phase of work that has been dated through material analysis to between the tenth and thirteenth centuries.[18]

So much for the evidence of the layers of plaster: what of the brickwork beneath? There are many surviving archaeological remains of fired brick structures from the Roman and late antique periods in Egypt, but none stand nearly as tall as the Red Monastery's perimeter enclosure—an unbroken wall eleven meters high. If this were dated to between the mid-fifth and mid-sixth century it would make it the single tallest example of standing fired brick masonry from this period in the country. While the physical survival of such a large

17 For a graphic representation of plaster layers, see "Appendix II: Numbering System and Key Drawings," in Bolman, *Red Monastery Church*, 306 (A2.5).

18 L. De Cesaris, A. Sucato, and E. Ricchi, "Wall Painting Conservation at the Red Monastery Church," in Bolman, *Red Monastery Church*, 270. See also D. Poggi, "Pigment and Plaster Analysis Report, Spring 2008 Campaign, Red Monastery Conservation Project," unpublished report submitted to the American Research Center in Egypt, March 2009, 23.

FIG. 5. Two pointed arches from the lower tier of windows of the south facade, 2011, showing variations in hood design (photos: author)

intact structure of this age is not impossible, it is improbable. A more precise objection to such an early dating of the masonry is that it ignores the presence of pointed arches on all the facades, first recorded by the British Egyptologist Sir John Gardner Wilkinson in 1855.[19] Such arches are employed in the lower tier of fenestration (fig. 5). Those on the south facade are the best preserved and most elaborate, using two different designs in their hoods that are made using rubbed bricks and an extremely fine flush pointing technique. Internally, a pointed arch also survives over the secondary blocked door to the west of the north entrance portal, although the external equivalent of this arch has been destroyed.

The pointed arch is not an architectural feature attested in Egypt prior to the ninth century, when it appears in the brick-built mosques of ʿAmr ibn al-ʿĀṣ (827 CE) and Aḥmad ibn Ṭūlūn (876–79 CE) in Cairo.[20] The Nilometer of Rawḍa (861 CE) also furnishes a further example, this time in stone. To claim that the pointed arches of the Red Monastery church are potentially two, or even three, centuries older than any other Egyptian examples would constitute a major upheaval in a hitherto well-established and cogently argued architectural chronology. In addition to the use of pointed arches, the external brickwork of the church has other medieval characteristics in its surface treatment. Zigzag patterns and crosses that are characteristic of the medieval period decorate its southwest corner. Although modern pointing has obscured these details, they can be seen clearly in the Darmstadt survey drawings and archival photographs (discussed below, at fig. 41).

19 See University of Oxford, Bodleian Library, Ms. Wilkinson dep.e.67 [notebook dated ca. 1855, 180 × 116mm], folio 51, with the note "these arches of the windows are stilted." For further details concerning Wilkinson and other early travelers to the Red Monastery, see N. Warner and C. Meurice, "A Strange Jumble of Roman Detail: Western Explorers and Antiquarians at the Red Monastery, 1673–1926," in Bolman, *Red Monastery Church*, 231–42.

20 For the architectural origins of the pointed arch and a chronology of its appearance in the Near East, see K. A. C. Creswell, *Early Muslim Architecture: Umayyads, Early ʿAbbāsids and Ṭūlūnids*, vol. 1, *Umayyads, A.D. 622–750* (Oxford, 1932), 278–80.

The evidence derived from the plaster, painted decoration, and brickwork of the Red Monastery church clearly indicates that a major reconstruction of the building took place during the medieval period. As to when this second building phase at the church might have taken place, epigraphic evidence helps refine the chronology. One surviving inscription at the eastern end of the north wall of the nave is clearly dated to 1285–86 and thus indicates that the rebuilding occurred before then.[21] This newly deciphered text antedates another inscription on the north wall of the northern side chamber, left by the painter Merkouri in 1301 and long considered to be the earliest surviving dated inscription in the church.[22] Therefore one can propose a date for the execution of the second building phase between the late ninth century (based on the use of pointed arches) and 1285 (based on the inscription). Plaster analysis, and the stylistic attribution of paintings on the plaster to the medieval period, slightly narrows this to the tenth through thirteenth centuries.[23] Graphic representations of these and subsequent phases in the development of the church appear in figures 6 and 7.

Previous reconstructions do not make a sharp distinction between the original foundation of the late antique church and its medieval rebuild (fig. 6, plans 1 and 2). This is perhaps understandable because the rebuilt church seems to have followed the design of its predecessor very closely in order to utilize preexisting foundations and the positions of the north and south portals. A continuity of construction must also have applied to the structure of the nave and its roof. The rebuilding may, however, have omitted certain features original to the first foundation. It obviously employed a more contemporary architectural language, with pointed rather than semicircular arches. In general, however, the rebuilding appears to have been meant to be faithful to the original—even to the extent of replacing the limestone cavetto cornice atop the enclosure walls (discussed further below). Thus, any proposed reconstruction of the late antique church must rely heavily on the structure of the rebuilt church, which undoubtedly incorporated major elements from the original foundation but may have suppressed or altered others.

What could have caused such a drastic rebuilding to take place? Was it a response to a slow degradation of the structure of the church over centuries, or the reaction to a single cataclysmic event such as an earthquake? Although no scientific reporting of earthquakes in Upper Egypt took place prior to the eighteenth century, major seismic events clearly affected the Sūhāǧ area before then.[24] According to inscriptional evidence, an earthquake seriously damaged the church of the White Monastery, where a major rebuilding in fired brick was concluded in 1259.[25] The same earthquake must certainly have affected the Red Monastery, located only three and a half kilometers away. Thus a strong practical case can be made for the simultaneous, or near simultaneous, reconstructions at both sites. Herein I will refer to the medieval rebuilding of the Red Monastery church as having taken place in the thirteenth century, with the caveat that unequivocal evidence for this date is still lacking.

Further deterioration and collapse seem to have followed the first rebuilding of the Red Monastery church, for which, once again, no precise chronological data exists. It is known, however, that when the church was restored for the second time, the nave was abandoned and a new wall, made of fired brick set in mud mortar with some limestone coursing, was built on a north–south alignment four meters to the west of the sanctuary facade, effectively shrinking the church (fig. 6, plan 3). The eighteenth-century English prelate Richard Pococke (1704–65) provides a terminus ante quem for this development as he observed that the wall was in place when he visited the church in 1737.[26] The space thus created was roofed with a variety of brick vaults, constructed below the top of the sanctuary facade that can be seen protruding above them in nineteenth- and early twentieth-century photographs (fig. 6, to right of plan 3). A replacement dome was

21 P. C. Dilley, "The Greek and Coptic Inscriptions in the Red Monastery Church," in Bolman, *Red Monastery Church*, 297–98 (N.n.i-1 and figs. 16.5, 17.3).

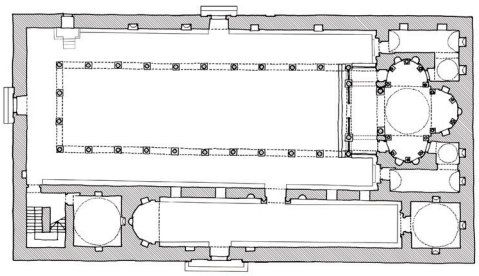
22 First published by W. de Bock, *Matériaux pour servir à l'archéologie de l'Egypte chrétienne* (St. Petersburg, 1901), 66–67 and fig. 76.

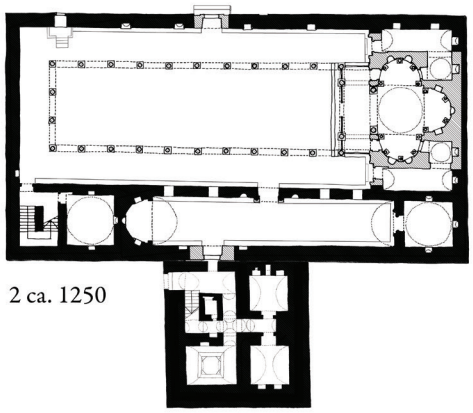
23 For the painted crosses, see E. S. Bolman, "A Medieval Flourishing at the White Monastery Federation: Material Culture," in eadem, *Red Monastery Church*, 203–16.

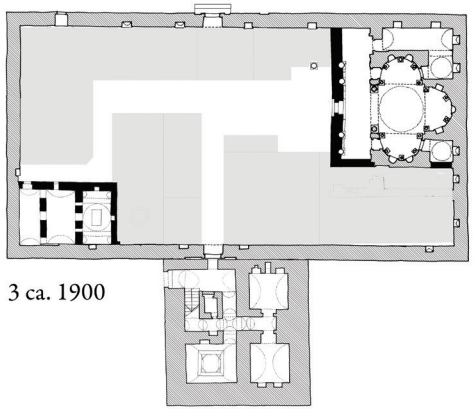
24 N. N. Ambraseys, C. P. Melville, and R. D. Adams, *The Seismicity of Egypt, Arabia, and the Red Sea: A Historical Review* (Cambridge, 1994), 149 and 81, 92 for Sūhāǧ tremors.

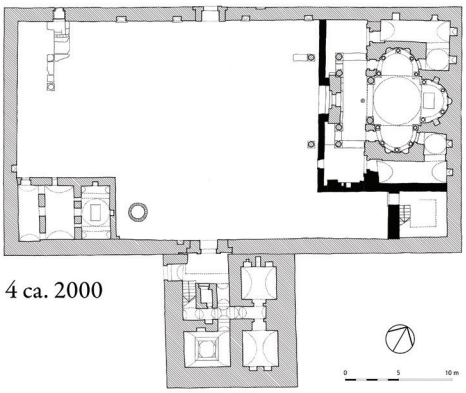
25 W. Crum, "Inscriptions from Shenoute's Monastery," *JTS* 5 (1904): 559–61; Monneret de Villard, *Les couvents près de Sohâg*, 1:28–29 and 31.

26 R. Pococke, *A Description of the East and Some Other Countries,* vol. 1, *Observations on Egypt* (London, 1743), 80.









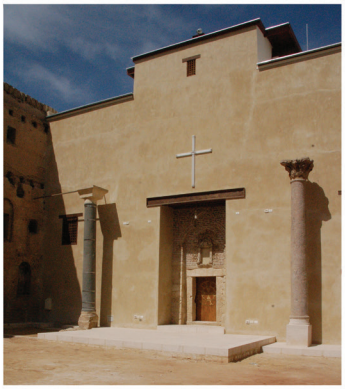


FIG. 6.
Phasing plans of the Red Monastery complex (left column) and major architectural developments (right column). **1** Reconstructed plan of late antique church showing hypothetical west door with, to right, view of bema and sanctuary facade; **2** Plan of rebuilt walls and new tower with, to right, the west elevation showing use of pointed arches (photo: author); **3** Plan of reduced area of church, new Church of the Virgin, and interior village houses (in gray tone) with, to right, the wall enclosing the east end of the church, 1897–98 (photo: Wladimir de Bock, from *Matériaux* [n. 22 above], pl. 25); **4** Plan of existing condition with, to right, the modern wall and roof structure in front of the sanctuary facade and nave columns (photo: author)

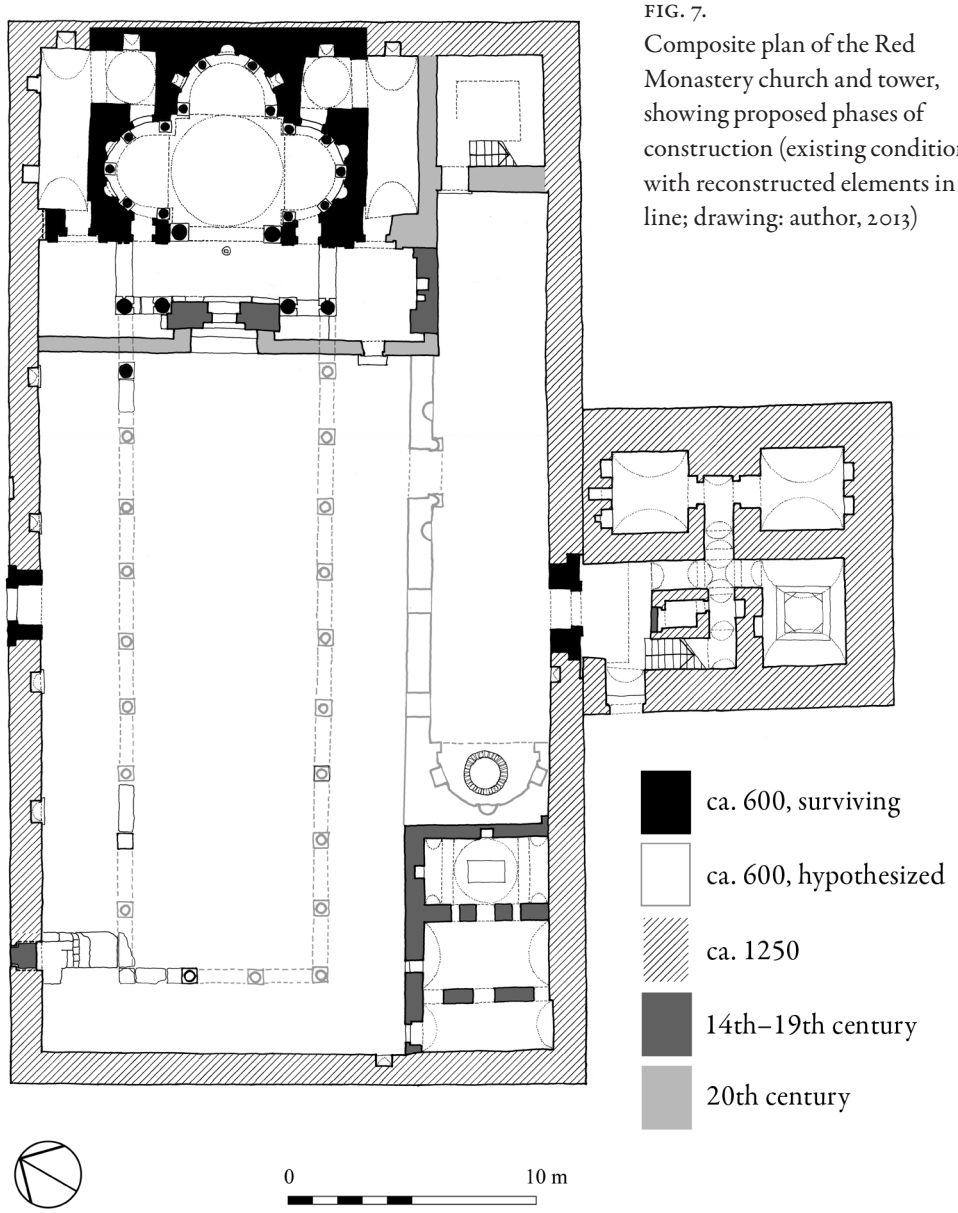


FIG. 7.
Composite plan of the Red Monastery church and tower, showing proposed phases of construction (existing condition with reconstructed elements in gray line; drawing: author, 2013)

probably built over the sanctuary at the same time. It is also likely that during this phase of activity blocking walls were built within the three conches of the sanctuary to prevent the collapse of their entablatures, a critical intervention that preserved both the structure and the decoration of the sanctuary. A watercolor by Wilkinson dating to the 1850s is the earliest record of these walls (fig. 8).

In 1909, the Comité removed all the vaults built in front of the sanctuary facade together with most of the wall that supported them, as well as the dome and the blocking walls in the triconch. Of the wall itself, only the centrally positioned trilobe portal incorporating late antique spoliate elements was left as evidence of this phase of activity (see below, fig. 22). The portal was subsequently incorporated into a new cross-wall (fig. 6, opposite plan 4; noted as modern in the summary description above) built on a slightly different alignment in 1912 by the Comité. Trilobe portals, which became almost ubiquitous during the Ottoman period (1517–1805), are documented in the Islamic architecture of Egypt from at least the thirteenth century, which

FIG. 8.
Interior of the sanctuary of the Red Monastery church ca. 1856 (watercolor: John Gardner Wilkinson, University of Oxford, Bodleian Library, Ms. Wilkinson dep.d.34, fol. 18, courtesy National Trust Images)

scarcely refines the date of the second rebuilding of the church. It can only be assumed that the church was reduced in size when the economic resources to undertake a full reconstruction were unavailable and the size of the community was at a nadir.

As far as the afterlife of the church from the eighteenth century onward, the most significant developments were the building of a small new church in the southwest corner of the enclosure (the Church of the Virgin [fig. 3, no. 10]) and the filling in of the remaining area with houses (fig. 6, plan 3). The building of this new church must have occurred in tandem with the abandonment of the early sanctuary, which is shown without an altar in Wilkinson's watercolor (fig. 8). As far as the village houses were concerned, the Comité cleared them from the nave by the end of the 1930s, leaving the condition of the complex more or less as we find it today (fig. 6, plan 4 and fig. 7).

Methodology of Reconstruction

So far I have indicated the need for a new reconstruction in light of recent discoveries, summarized the general scope of that reconstruction, described the surviving architectural context of the church, and put forward a working hypothesis for the sequence of loss and renewal of its fabric. It remains to explain the methodology used to reach some of the conclusions that follow. Without detailed textual records, any reconstruction must depend primarily on physical evidence. This requires the interpretation of the archaeological and architectural remains and a close inspection of earlier documentation (both photographic and drawn). The reconstruction of the building in cross-section necessarily relies partly on the application of basic structural principles and partly on aesthetic or stylistic considerations. A comparison with other largely intact early churches in Egypt, such as that at the Monastery of St. Katherine in the Sinai, is instructive (see fig. 9D). Even more valuable is the study of other churches that fall within the same typology of the triconch basilica.[27] The latter include, aside from the gigantic stone church of the White Monastery (fig. 9A) that is the most relevant parallel to the Red Monastery church, the unnamed churches at Dendera (fig. 9C), Dayr Anbā Bakhūm to the north of Akhmīm on the opposite

27 See Kinney, "Type" (n. 12 above), 37–47 and fig. 5.9.

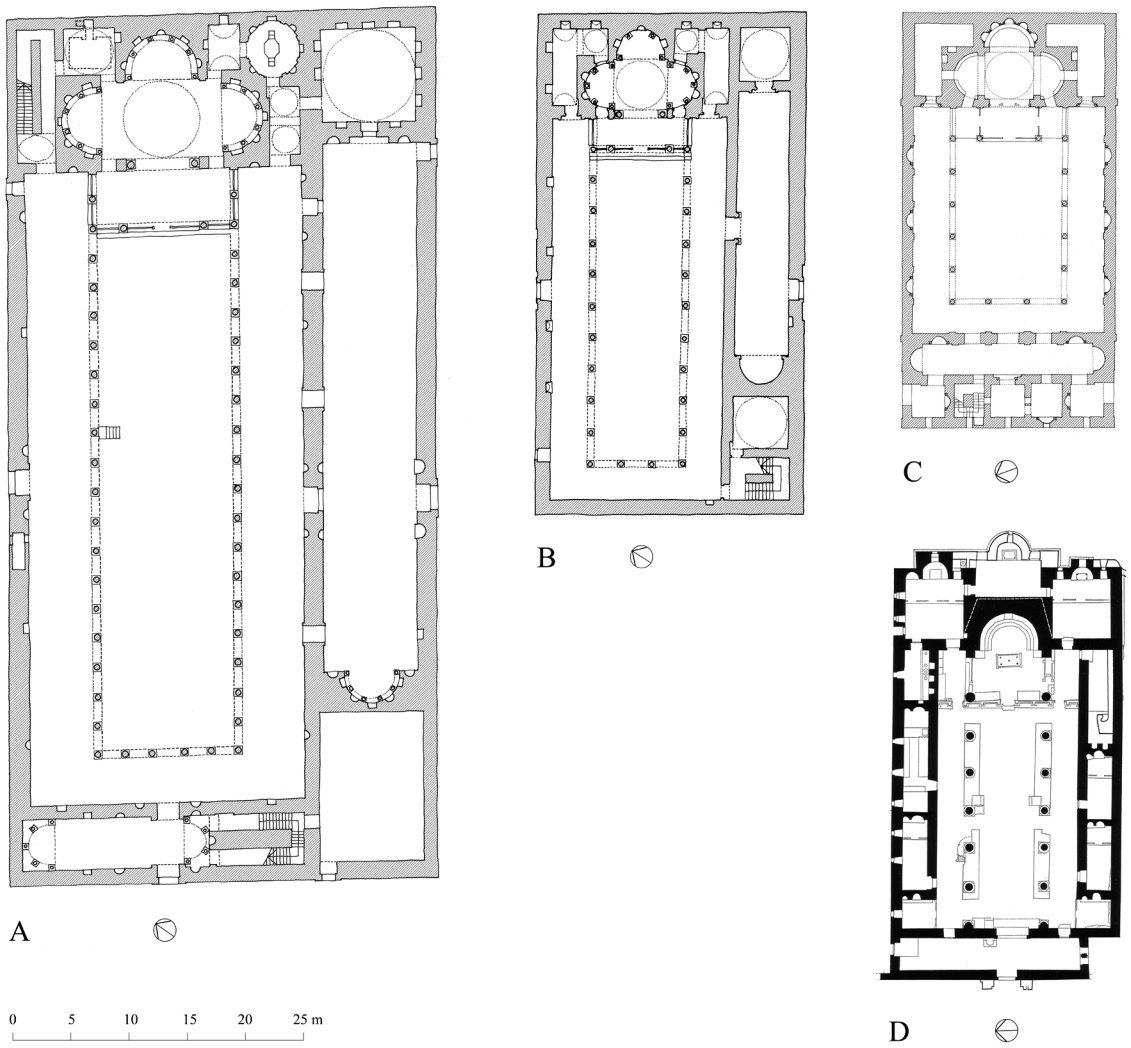


FIG. 9. Reconstructed plans to scale showing **A** White Monastery church; **B** Red Monastery church; **C** church at Dendera; **D** St. Katherine's Monastery church (after Forsyth and Weitzmann; all other drawings by author, 2014)

side of the River Nile to Sūhāǧ, Dayr Abū Maṭmar near Minyā, Dayr Abū Mattā in the oasis of Dakhla, and a small funerary triconch within the precincts of the White Monastery.[28] At Dendera, the limestone pavement of the Roman mammisi (birth-house) adjacent to the church also retains a full-scale mason's setting out drawing for the church's triconch. These examples show that triconches could be built in stone, fired brick, and mud brick. They could also vary considerably in scale, although at least three of the extant

28 This group excludes the church of Dayr Abū Fānā, as it is not a true triconch, and the triconch recorded at Anṣinā by Peter Grossmann, which this author was unable to verify on site (Grossmann, "Die von Somers Clarke" [n. 8 above], fig. 2). Monneret de Villard's photographic archives, held at the Istituto Nazionale di Archeologia e Storia dell'Arte in Rome, also contain two unnumbered images of a fired brick triconch, now destroyed, at Fusṭāṭ. The vast transept basilica at Marea is also not considered to fall into this typology as it has an east conch of much smaller dimensions than those to the north and south, and is furthermore lined with a free-standing arcade of columns. For the funerary triconch, see S. J. Davis and G. Pyke (with contributions by others), "Shenoute and a Newly Discovered Tomb Chapel at the White Monastery," *JEChrSt* 18, no. 3 (2010): 453–62.

exempla listed above are almost exactly the same size in plan, suggesting the possibility of standardization.

For the sake of clarity the following analysis has been divided into two parts. The first relates to the original form of the late antique church (figs. 10–36) while the second addresses the modifications made to this structure that are thought to have taken place in the thirteenth century. A variety of means of representation are used to convey this complex history, including conventional architectural drawings as well as digitally manipulated photographs, and to facilitate the process of visualizing so much missing architecture.

The Late Antique Church

The physical inventory of the architecture of the Red Monastery church indicates that the most significant surviving elements of the first church comprise the triconch and parts of the rooms flanking it, the sanctuary facade and bema, some columns and capitals on the bema and in the nave, and the north and south portals. As noted previously, these are the elements that have been variously dated by analyses of their architectural sculpture to between the late fifth and mid-sixth centuries. Further study of the form of the first church at the site must begin from the premise that its perimeter walls and major internal divisions remained in their original position when the building was substantially reconstructed in the thirteenth century. This assumption is supported by the fact that the first builders of the church appear to have adopted a coherent system of proportion when setting out their work: a system that was generally respected when the church came to be rebuilt.

Proportion

Any discussion concerning the use of proportioning systems to determine the size and location of specific architectural features at the church is bound to be hypothetical in character. Yet it is undeniably the case that proportional guides were used historically in Egypt to ensure the coherence of different building elements. The simplest of these guides relied on the multiplication of squares to form a grid, and were employed by artists, sculptors, and architects in ancient Egypt working in both two and three dimensions. More complex relationships developed through triangles and the golden section may also have been employed. By the late antique period, numerous texts related to the mathematics required for complex structures were part of the architectural education of the *mechanikoi* (engineers / architects / master builders) of Alexandria.[29] The texts range from simple manuals of quantity surveying to more elaborate works on geometric forms. Particularly significant is the treatise on stereometry first compiled by Heron of Alexandria in the first century CE but modified up to and including the Byzantine period. This work includes calculations for the surface areas and volumes of curved surfaces such as domes and conches, and is illustrated with diagrams for calculating their sizes. It demonstrates a sophisticated architectural and mathematical understanding of forms that are an important feature of the monastic churches of Sūhāǧ. This understanding is founded on exact systems of measurement and proportional relationships.

What physical evidence can be used to support the contention that proportion was a concern of the builders of the Red Monastery church? The full-scale ground plan inscribed next to the church at Dendera is suggestive. First it implies that the builders at the Red Monastery, like their counterparts at Dendera, were fully cognizant of architectural drawing conventions, following in a long tradition of ancient Egyptian masons. Second, the consistency in sizes between the triconches built at Dendera, the Red Monastery, and Dayr Anbā Bakhūm, possibly constructed within the period of a century, points to the adoption of a standardized, proven design.[30] Another clue is provided by the treatment of the spoliated granite column shafts at ground level in the triconch of the Red Monastery church. These shafts are set into the ground with limestone collars at their bases to imitate solid bases, showing that considerable care was taken in the detailing of the internal elevations of the triconch (fig. 10).[31] To solve the problem caused by the discrepancy in the lengths of the shafts without resorting to cutting them down would require either the building up of the bases to different heights or the adoption of counterfeit bases.

29 For a survey of the material see J. McKenzie, *The Architecture of Alexandria and Egypt, c. 300 B.C. to A.D. 700* (New Haven, 2007), chapter 12.

30 As noted in ibid., 282 and fig. 473.

31 For parallels to this treatment at Petra, see S. M. Rababeh, *How Petra Was Built: An Analysis of the Construction Techniques of the Nabataean Freestanding Buildings and Rock-Cut Monuments in Petra, Jordan* (Oxford, 2005), 129–34.

FIG. 10.
View of limestone collar around central granite column shaft in south conch of sanctuary prior to conservation, 2013 (photo: Gillian Pyke)

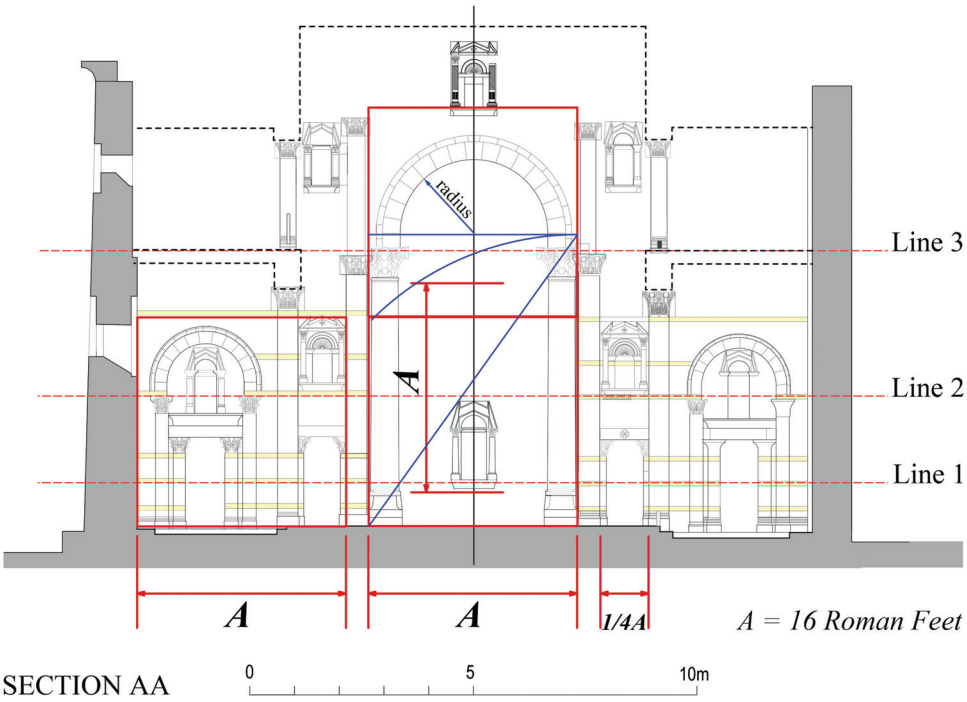
Combining the historical and physical contexts sketched above, it seems reasonable to suppose that a basic proportioning system was used in the setting out and construction of churches such as that of the Red Monastery. If this is indeed the case, what was the unit of measurement employed? Several alternatives present themselves: the Egyptian cubit (52.5 centimeters), the Ptolemaic foot (35 centimeters), the Roman foot (29.2 centimeters) and the Byzantine foot (31.5 centimeters).[32] Given the impossibility of knowing which unit of measurement was actually used, and the likelihood that many key dimensions have been altered by rebuilds, changes in floor levels, or deformation, it seems more profitable to use an existing dimension from within the building as a starting point for the calculation of relative proportions.[33] It has been observed that for sixth-century Byzantine architecture the span of a vault or a dome was often used as a governing dimension.[34] With this in mind, the dimension of the crossing of the sanctuary itself—the most significant space symbolically within the Red Monastery church and one also defined by the circle of the inscribed plan at Dendera—has been adopted as the starting point for a basic proportional analysis that is superimposed on a plan showing the reconstructed positions of the nave, its aisles, and the south hall (fig. 11). This key dimension seems to correspond to sixteen Roman feet, marked as *A* on figure 11.

The plan of the church on figure 11 shows the square of the sanctuary (A^2) with additional half-squares defining the depth of each conch. If a gap in the plan is left (marked by dashed red lines on fig. 11, plan), corresponding to the width of the arches of the north and south conches as well as the inner columns on the bema, the same module (A^2) aligns the inner faces of the outer walls bordering the north and south aisles. The internal width of the whole church is four modules plus the thickness of the central columns on the bema and the thickness of the wall between the main church and the south hall. The width of the south hall itself is

32 For metrology see McKenzie, *Architecture*, 322; P. A. Underwood, "Some Principles of Measurement in the Architecture of the Period of Justinian," *CahArch* 3 (1948): 64–74; R. Ousterhout, *Master Builders of Byzantium* (Philadelphia, 2008), 75. The Roman foot in Egypt is apparently shorter than its Italian equivalent.

33 Particularly significant is a drop of 15 centimeters on the south side of the triconch and facade wall due to ancient subsidence.

34 Underwood, "Some Principles of Measurement," 64; Ousterhout, *Master Builders*, 75–76.



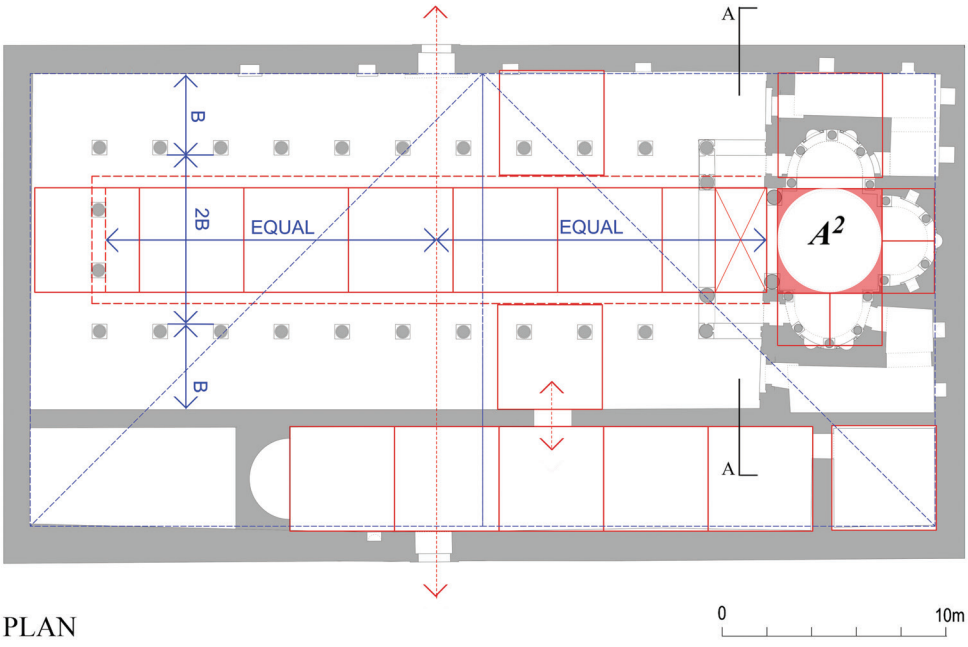


FIG. 11. Elevation of sanctuary facade (top) and ground plan of church (bottom) showing basic proportional relationships that may have been used in the late antique period (drawing: author, 2014)

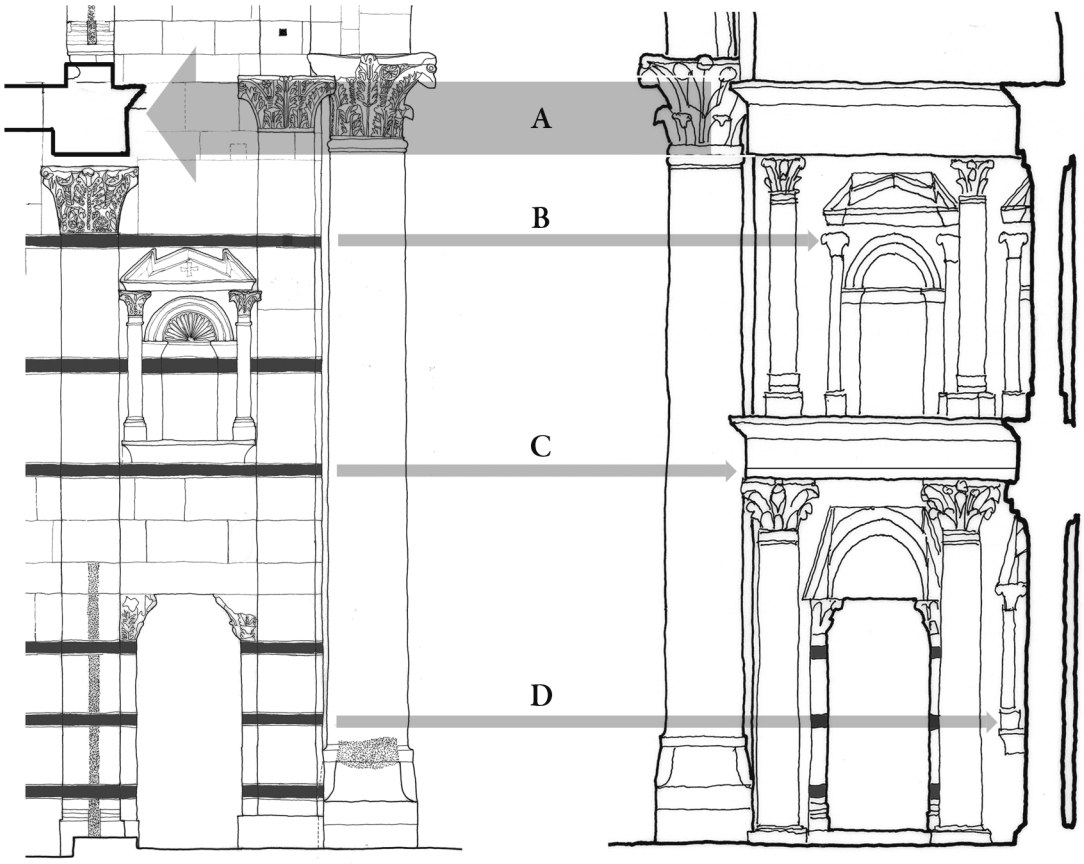


FIG. 12. Schematic elevations showing wooden bands on the sanctuary facade (left) and their relationship to features within the sanctuary (right) (drawing: author, 2014)

one module, and the size of the room at the east end of the hall is a square module. From the sanctuary facade to the inside of the west wall of the nave is seven modules. The width of the bema in front of the sanctuary facade is half a module.

The entire internal area of the church enclosure is created by two large squares. The size of these squares is not an exact multiple of the A^2 module, but is rather four and a quarter modules. That the two units are related may be of no relevance. It is perhaps of more significance that the centerline between the two large squares does not provide the axis of the north and south portals, as might be expected. Rather this is located halfway between the sanctuary facade and the line of the gallery of the return aisle at the west end of the nave (fig. 11, plan, equal arrows). A similar, but not identical, superimposition can be made upon the plan of the White Monastery church, where two squares also provide the area of the church within its perimeter walls, excluding the narthex. In this case, the axis of the central north portal is placed exactly between the west wall of the nave and the sanctuary facade.

At the Red Monastery church, the doorway between the south hall and the south aisle of the church, noted in the 1962 Darmstadt survey (discussed below), was located at the midpoint of the hall. This can be reconstructed as a space occupying five complete modules in plan, with a possible exedra beyond at its west end. Further analysis is required to determine the geometric origins of the combined width of the nave and its aisles, as well as the spacing of the nave's columns. Perhaps a more basic relationship was used as a starting point: the width of the nave between the stylobates of the aisles is close to double the width of each aisle including its stylobate (fig. 11, plan, arrows B, 2B).[35]

35 As at the basilica of Philippi, noted in Underwood, "Some Principles of Measurement," 71.

Looking at the sanctuary facade, we find that not only do the shafts of the large granite columns flanking the opening to the sanctuary correspond to the same module dimension (*A*) of sixteen Roman feet, but that two superimposed squares provide other critical dimensions such as the height of the bottom of the central high-level niche in the facade and the soffits of the aisles. The width of the recesses in the facade containing openings into the sanctuary is one quarter of the module. The height of the springing of the chancel arch (whose center lies one course of masonry above the tops of the capitals), and therefore the height of the three arches of the semidomes in the sanctuary as well, is established by the golden section of the basic module (*A*). The position of many other elements of the facade can also be derived from subdivisions of the basic module into a golden section, and can even be seen to determine the sizes of individual niches.

At least three key horizontal regulating lines seem to be employed in the design of the facade. The first and lowest line is at the level of the bottoms of the niches in the sanctuary (fig. 11, line 1 and fig. 12, line D). This may also once have been related to the height of a low screen around the bema in front of the sanctuary. The second, mid-level line corresponds on the facade wall to the bottoms of the lower tier of niches flanking the chancel arch and the tops of the capitals of the major order flanking the side portals, as well as the bottom of the lower entablature of the triconch (fig. 11, line 2 and fig. 12, line C). Both these lines are clearly marked by wooden banding, which will be described in more detail below. The third, and topmost, line corresponds to the top of the upper entablature of the triconch as well as the top of the column and pilaster capitals immediately below the chancel arch (fig. 11, line 3). This line also dictates the height of the galleries (fig. 12, line A) and was probably emphasized by a continuous carved stone cornice running around the nave.

Despite the obvious danger of regarding a mathematically derived harmony as the basis for all aspects of the design of the Red Monastery church, even the cursory analysis above suggests that some proportional method was actively employed, not only in the original foundation of the church but also in its medieval reconstruction. It is also probable that a single physical measure, or rod, was the foundation of the whole system of spatial interrelationships in both plan and elevation, and that this was fundamentally tied to the key dimension of the sanctuary crossing.

The Nave and Its Galleries

The geometry underpinning the design of the Red Monastery church has been described above, but not its materiality or technology of construction, which will now be addressed in relation to specific spatial features within the church (keyed on figure 13), commencing with the nave—the area that presently exhibits the greatest loss of original fabric within the entire complex.

Assuming that the medieval builders followed a preexisting ground plan, a ring of twenty-four columns once defined the nave of the late antique church (fig. 13 [1]). Traces of three column emplacements survive at the northwest corner of the nave and four complete shafts with three purpose-made capitals now stand at its east end.[36] The wall built to enclose the sanctuary and its facade in 1912 conceals two of these columns. The general arrangement of columns reflects that found at the White Monastery church, with a return aisle at the west end. Unlike the columns of the White Monastery church, however, those of the Red Monastery had purpose-made capitals rather than capitals taken from other antique structures.[37] The colonnades of both churches formerly supported large galleries located on the north, south, and west sides of their naves. In the Red Monastery church, a combination of surviving columns, pilasters on the sanctuary facade, beam holes in the perimeter wall, and doorways leading to rooms located above the chambers to the north and south of the sanctuary indicate the former position of these galleries (fig. 13 [12]).

What purpose did such galleries serve? Galleries became a common feature of basilical-plan eastern Christian churches by the fifth century. Although they are traditionally interpreted as being for the use

36 Until 2014, there were only three standing columns belonging to the nave colonnade but at this date a further surviving granite column shaft was erected upon a new limestone base as the mirror for the surviving gray granite shaft on the north side of the nave. This has an original limestone capital placed over it.

37 The first western visitor to the Red Monastery in 1673, Johann Michael Wansleben, describes the columns of the church as "more beautiful" than those of the White Monastery, and having a uniform height and thickness. See J. M. Vansleb, *Nouvelle relation en forme de journal, d'un voyage fait en Egypte: Par le P. Vansleb, R.D., en 1672 & 1673* (Paris, 1677), 376–77.

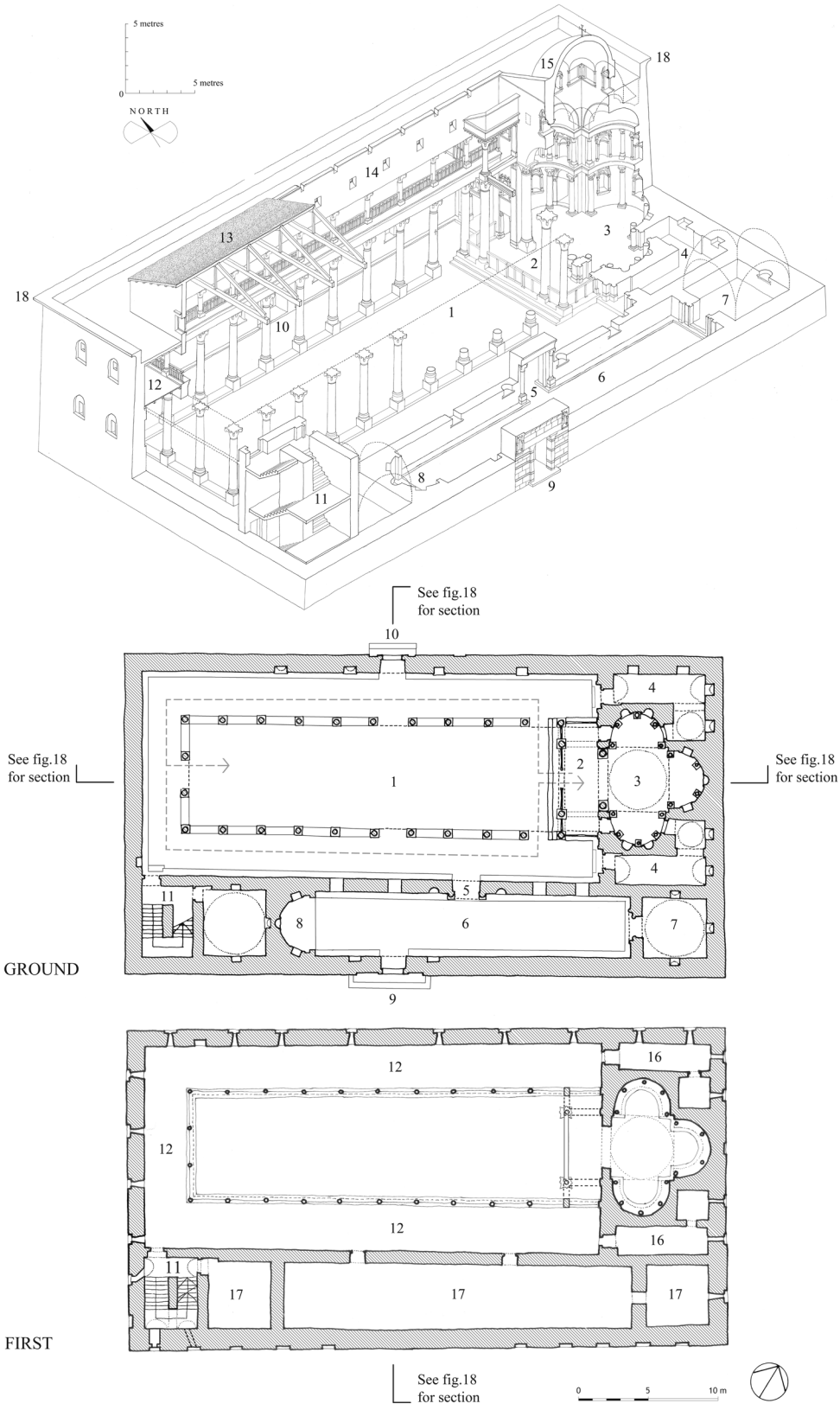


FIG. 13.
Reconstructed cutaway isometric (top) with ground plan (center) and gallery plan (bottom) of the Red Monastery church in the late antique period. **1** Nave; **2** Bema; **3** Triconch; **4** Side chambers; **5** Entrance and south wall of nave; **6** South hall; **7** Room to east of south hall; **8** Exedra; **9** South portal; **10** North portal; **11** Staircase; **12** Gallery; **13** Roof; **14** Clerestory; **15** Dome; **16** Upper side chambers; **17** Service space; **18** Cavetto cornice. Possible processional routes are shown in dashed lines on the plan at ground level (drawing: author, 2016)

of women during services, evidence from the wider Byzantine context suggests that gender boundaries were not so clear.[38] At the Red and White Monastery churches, it has been suggested that nuns associated with the federation of Anbā Šinūda occupied the galeries, but there is no direct proof of this practice in the monastic rules.[39] In the Red Monastery church, women would also have had to pass through the main church to access the gallery, compromising any vertically oriented gender boundaries. In this context it may be noted that Procopius, writing circa 550–560, remarks of Hagia Sophia that one of the aisles of the nave was reserved for women at prayer: a pattern of use by no means unique.[40] The conditions applying to Egyptian monastic churches may well, however, have been more particular.

At the Red Monastery church, the distance between the nave columns in relation to the height of the gallery floor, as marked on the sanctuary facade, determines that flat lintels made of large sections of timber rather than stone arches supported the edges of the gallery.[41] Surviving loose fragments of decorative carved limestone cornices, recorded during the recent conservation campaign, further suggest that the entablature above the nave columns was quite elaborate (fig. 14). As noted above, this entablature probably corresponded closely in size with that of the upper tier of the triconch, establishing a horizontal datum running all the way through the church. Two sizes of cornice blocks survive: large "structural" blocks with a section of undecorated frieze included and small blocks with only the section of projecting cornice.[42] It seems likely that the large blocks, including a re-entrant corner block, were used in the main entablature of the nave. These blocks have an undecorated frieze, astragal, and cornice with an arcade of beaded semicircles containing diverse floral motifs with other trilobed plants in the spandrels of the arcade. The smaller blocks may have been used as a secondary cornice either in the nave, or in a different location altogether. They are characterized by slit modillions alternating with floral and geometric motifs. In the White Monastery church, sections of an almost identical cornice can be seen on the east wall of the south hall.

Discrepancies in size and material indicate that a variety of different antique structures furnished the surviving column shafts at the Red Monastery church, and that their bases were adjusted to achieve a uniform level for the tops of the shafts. The circular sections of most shafts have been shaved down to become oval, in order to remove traces of earlier carving or to create new Christian motifs in raised relief.[43] Judging from the treatment of the columns in the sanctuary and other fragmentary shafts that have been roughened deliberately, it is likely that many, if not all, of the nave columns were plastered and painted. This would have provided further opportunity for rectifying any surface irregularities or inconsistencies in the shafts.

One particularly curious architectural feature of the nave is a pseudo-stylobate that runs between the column pedestals (fig. 15). Limestone blocks of a width equivalent to the pedestals (65 centimeters) can be seen at either end of the line of columns on the north side of the nave. The blocks stand seventeen centimeters above the level of the floor of the nave (described below). They do not run beneath the column bases, however, and so cannot be described as an functional stylobate, one that would have provided a continuous supporting ring of masonry under all of the columns of the nave. There is no evidence in the form of grooves or clamps that a screen of any description stood between the columns on top of this pseudo-stylobate. Even without a screen, however, the step created by the blocks ensures a degree of spatial separation between the aisles and the nave and was probably also used as a low bench for sitting. It is possible that this step had a liturgical purpose, defining a processional route that started on the bema

38 See R. F. Taft, "Women at Church in Byzantium: Where, When—and Why?" *DOP* 52 (1998): 27–87.

39 P. Grossmann, "Gallery," *Coptic Encyclopedia*, 1:210.

40 Taft, "Women," 35.

41 Clarke, *Christian Antiquities* (n. 5 above), 164 came to the opposite conclusion, but his drawing reproduced in pl. 51 clearly shows that there would have been no space for arches beneath the line of beam holes for the gallery. Monneret de Villard, *Les couvents près de Sohâg* (n. 2 above), 2:96, declared Clarke "false" and proposed a trabeated structure. This was also the case, for example, at the basilica of Ašmūnayn: see A. J. B. Wace et al., *Hermopolis Magna, Ashmunein: The Ptolemaic Sanctuary and the Basilica* (Alexandria, 1959), 37.

42 In 2014 the small cornice blocks were installed in a new display within the enclosed area in front of the sanctuary for their future protection.

43 Not a unique occurrence: the same phenomenon can be seen, for example, in the granite columns of the church excavated on Elephantine Island in Aswān.

FIG. 14.
Examples of carved limestone cornice blocks of two designs. Top: large blocks with beaded arcades. Bottom: small blocks with flat slit modillions including, at left, a re-entrant corner block (photos: author, 2014)

and continued around the aisles of the church before returning to the bema (a dashed gray line marks this hypothetical route on the ground plan in fig. 13). The blocks stop short of the bema, and may also have been omitted in those parts of the arcade opposite the northern and southern entry points to the church. Similar stylobates are also attested at other major late antique churches such as that of the White Monastery and the South Church at Ašmūnayn.[44] At the five-aisled basilica of the Pachomian monastery at Pbow (modern Fāw Qiblī) similar stylobates even have small steps up to them to provide better access between the aisles.[45]

Another feature of the nave that has substantially disappeared are the narrow limestone benches that once lined the aisles along the edges of the perimeter walls. Archival documentation in the form of photographs taken at the time of the 1909–1912 restoration and drawings produced by the 1962 survey show these benches, which measured approximately 30 centimeters in height and width. A reinforced concrete ring beam, cast around the perimeter walls of the church in the 1980s, has now destroyed all trace of these elements except in one location on the north wall. Here,

44 For Ašmūnayn, see D. M. Bailey, *Excavations at El-Ashmunein*, vol. 4, *Hermopolis Magna: Buildings of the Roman Period* (London, 1991), 46.

45 I am grateful to Peter Grossmann for this observation.

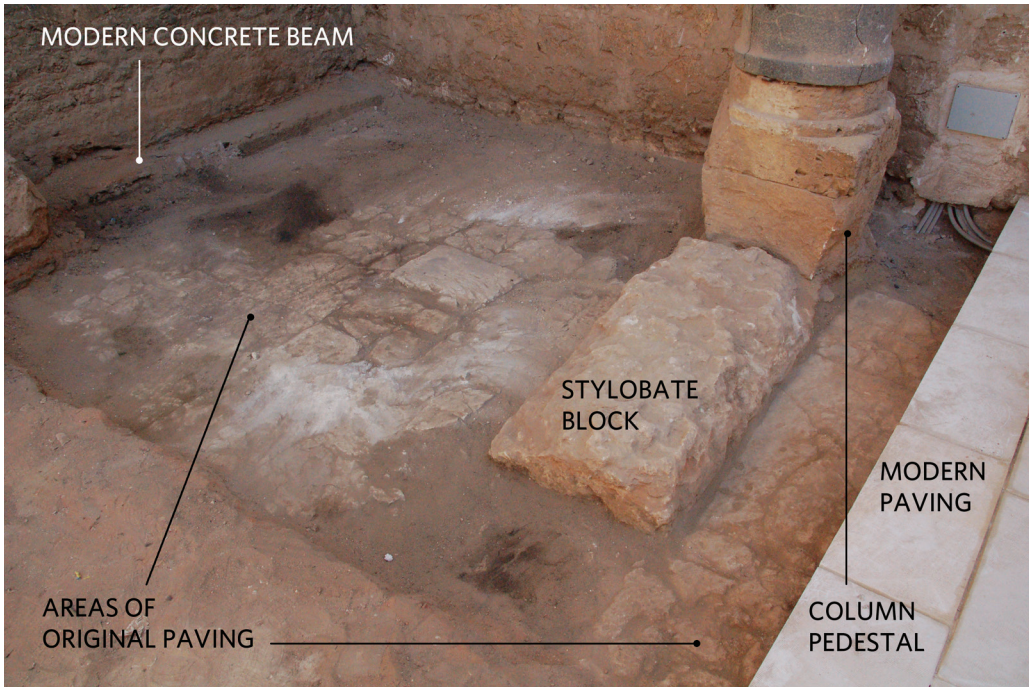


FIG. 15. Elements of the northeast corner of the nave floor (photo: author, 2013)

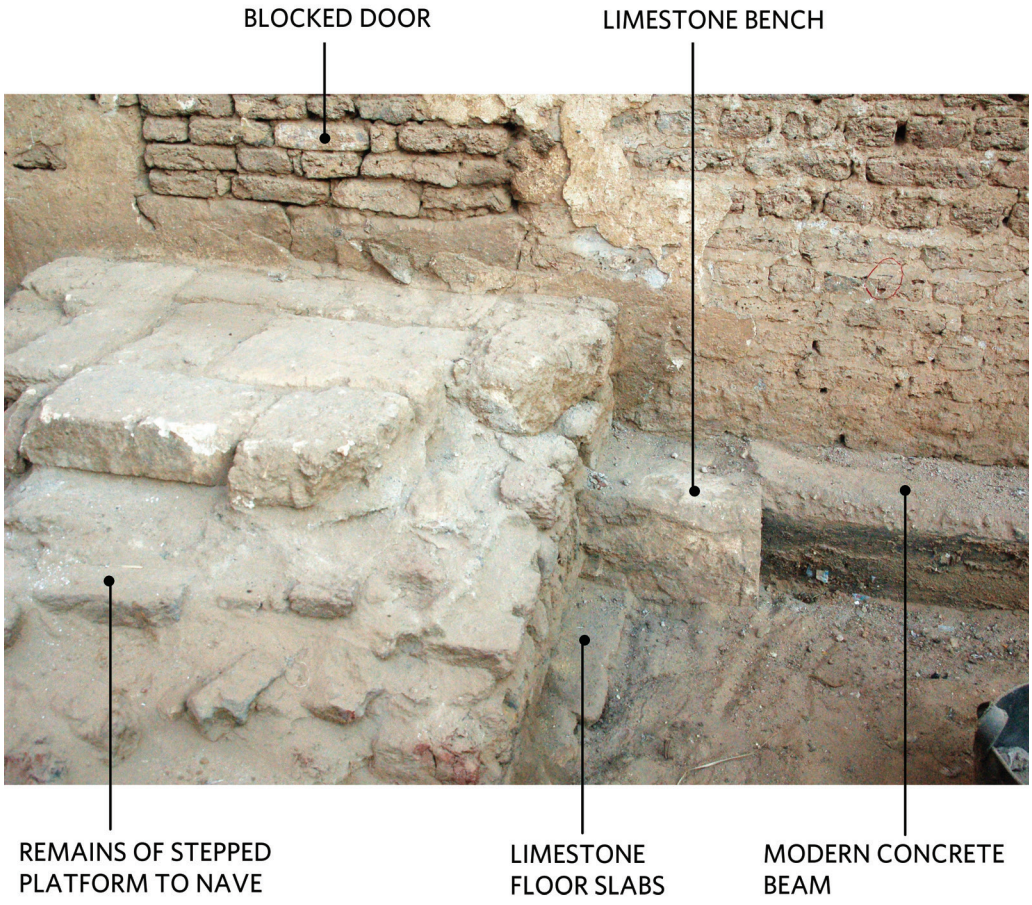


FIG. 16. Elements around the steps at the west end of the north aisle of the church (photo: author, 2013)

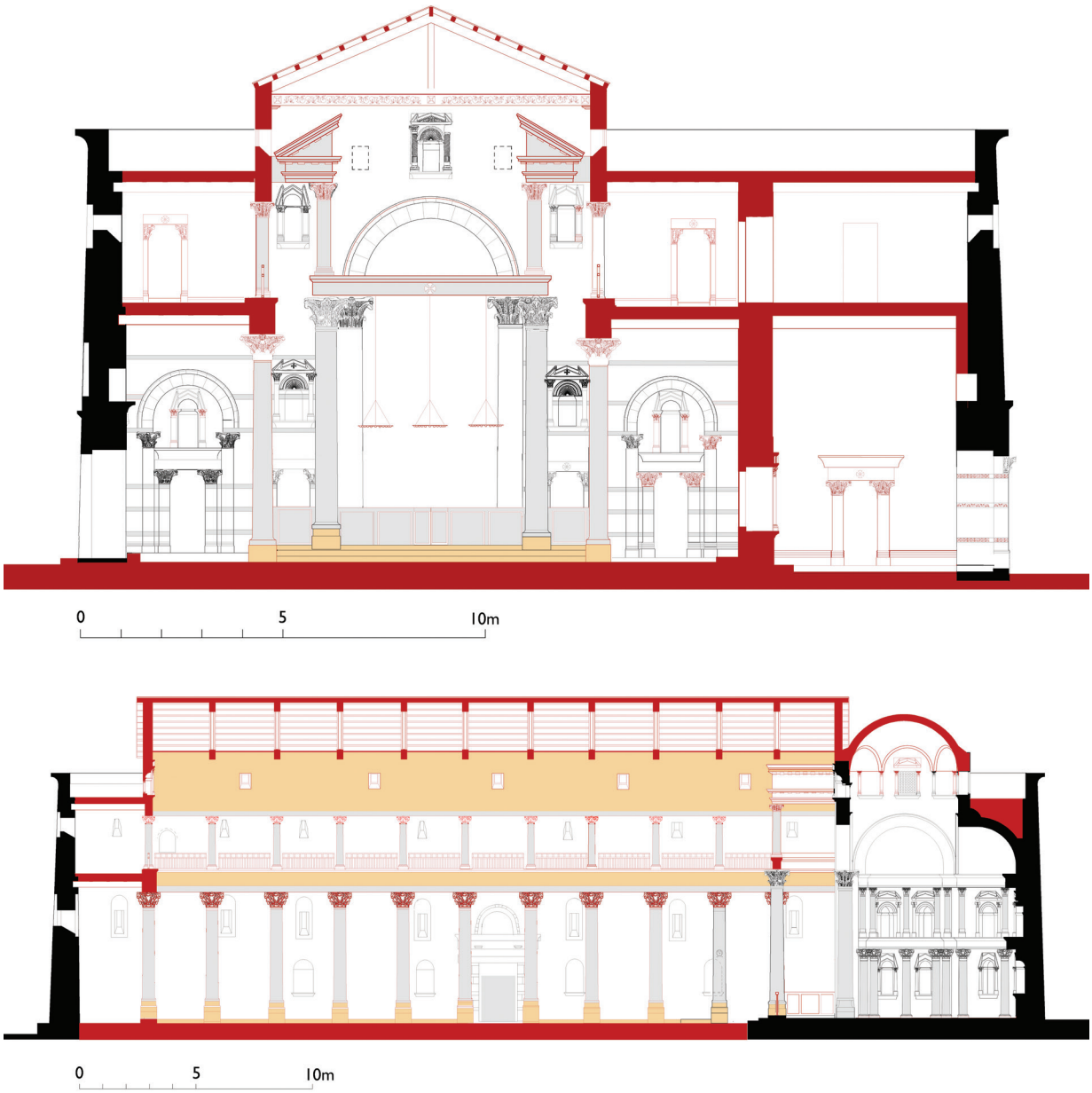


FIG. 17. Reconstructed sections through the late antique church. Top: north-south section looking east through the nave and south hall; bottom: east-west section looking north through the nave showing gallery arcades with columns, clerestory windows and dome over triconch (drawing: author, 2014).

the bench runs underneath a small platform that leads to a secondary door in the perimeter wall that was constructed during the later rebuilding of the church (fig. 16). Such benches can be commonly seen in many other late-period temples and early churches, and a similar stone bench is partially preserved around the perimeter of the White Monastery church.

In 2008 at the west end of the nave, a horizontal setting-out line for the floor was discovered, drawn in red paint on one of the stylobate blocks but without any associated original paving. This was followed by the discovery, in 2013 and 2014, of two areas of late antique limestone paving in the northeast corner of the nave. This paving was made of fifteen-centimeter-thick

limestone slabs measuring fifty by one hundred centimeters laid in staggered courses, suggesting that the entire nave may once have been paved in this manner (fig. 15 and plan in fig. 28). No archaeological evidence survives, however, for any of the liturgical structures that once may have stood within the nave.

Architects have put forward a number of alternative reconstructions of the gallery of the Red Monastery church (fig. 13 [12], fig. 18). It could have been ringed by a perimeter arcade of freestanding columns or by a line of solid piers. It may even have been defined by a wall punctured with openings, as is shown in the reconstruction of Evers and Romero.[46] Grossmann (1969) adopts the idea of piers.[47] Monneret de Villard (1926) and Grossmann (2006) propose arcades of small columns superimposed upon the main columns of the nave. It is entirely possible that the design of the gallery of the early church differed from that of the rebuilt church, with a columnar structure being replaced by a masonry solution. There is scanty physical evidence, in the form of some fragments of small columns shafts found in the lapidary detritus of the church today, that gives credence to the proposition that a colonnade of small columns did encircle the gallery (figs. 13 [12] and 17).[48] The presence on the sanctuary facade of pilasters (also with grooves in their bases) on the line of structure of the gallery is better proof in favor of the use of columns rather than piers to line the gallery. In order to fit between the structure of the gallery and the roof, however, any columns at gallery level appear almost ludicrously small in contrast to the scale of the principal columns of the nave. The possibility of piers, therefore, replacing the columns at the edge of the gallery cannot be summarily dismissed.

Monneret de Villard proposed solid balustrades of paneled marble at the edges of the gallery, for which there are no obvious parallels in Egypt.[49] Such a material would almost certainly require importation, since Egyptian marble is of relatively poor quality. Alternatively, thicker perforated limestone balustrades could have been used. However, timber balustrades would have provided a more economical and lightweight solution, and the narrow six-centimeter width of the grooves on the sanctuary facade where balustrades abutted it supports this opinion. In the absence of any surviving fragments of a stone balustrade, whether solid or perforated, timber is therefore shown in the reconstruction of the balustrades proposed here (figs. 13 and 17).

The Nave Roof

The form of the roof of the nave of the Red Monastery church has been debated for more than a century. It should be emphasized that the roof over the early church may well have differed significantly from that of its medieval replacement. There was obviously a considerable period in the later history of the church when the roof had collapsed (for a second time) and no suitable timber, or funding, could be found to replace it. Could the nave have originally been covered with a flat roof? Its width of eight meters is not impossible to span with individual large timber beams. At the church of the White Monastery, however, the use of a truss and pitched roof was a structural necessity to span the width of the nave. As the Red Monastery church seems to be modeled on its design it is reasonable to assume that a truss roof was also used there (fig. 13 [13]).

The oldest surviving church roof made of timber in Egypt is that of the Justinianic basilica of St. Katherine's Monastery in the Sinai (548–565). Although the architectural design of this church may be of a lineage completely different from that of churches found in the Nile Valley, its roof offers the closest physical parallel for the roofs that once covered the naves of both the Red and White Monastery churches. At St. Katherine's, despite the major difference in the respective pitches of the roof's masonry gables and the trusses in place today, a recent analysis has indicated that the entire wooden structure is original.[50] The timber used for the trusses and purlins is

46 Evers and Romero, "Rotes und Weisses Kloster" (n. 7 above), fig. 76.

47 Grossmann, "Die von Somers Clarke," fig. 3.

48 Sections of column shafts with diameters ranging between 25 and 36 centimeters survive in the nave, significantly smaller than the 65-centimeter diameter of the larger columns used for the main colonnade of the nave.

49 Hagia Sophia in Istanbul and San Lorenzo fuori le Mure in Rome might be cited as foreign parallels for the use of solid balustrades.

50 For details of this roof, see P. Koufopulos et al., "The 6th Century Timber Roof of St. Catherine Sinai: Identification, Research and Proposals for Its Protection," in *Interaction between Science, Technology and Architecture in Timber Construction*, ed. C. Bertolini-Cestari, T. Marzi, E. Seip, and P. Touliatos (Paris, 2004), 563–72. For the external discrepancy in pitches, see G. H. Forsyth and K. Weitzmann, *The Monastery of Saint Catherine at Mount*

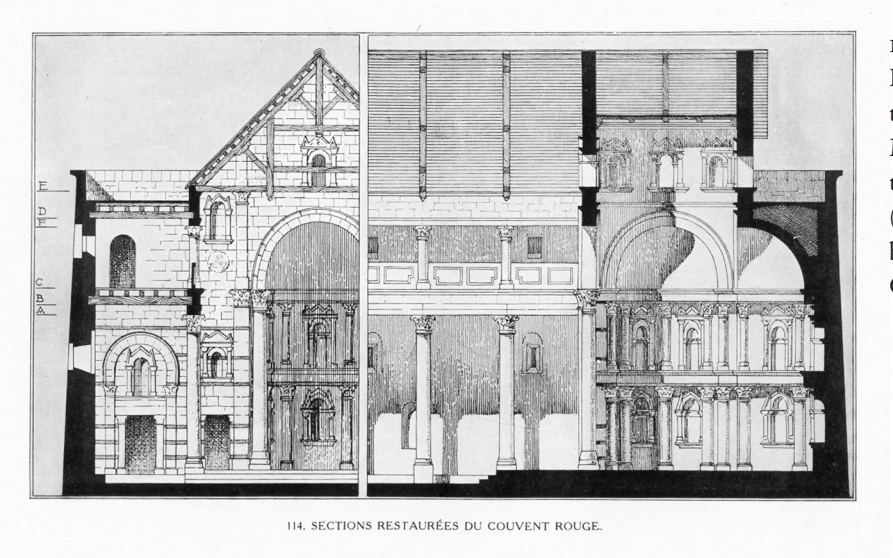


FIG. 18
Reconstructed sections through the church by Ugo Monneret de Villard (1926 top) and Peter Grossmann (2006 middle and 1969 bottom, courtesy Peter Grossmann).

imported fir. A similar roof is also thought to have covered the Justinianic basilica on top of Mount Sinai.[51]

In his reconstruction of the Red Monastery church, Monneret de Villard shows a massive, steeply pitched, hammer-beam roof construction extending fully over the sanctuary as well as the nave (fig. 18).[52] The pitch of this roof is clearly modeled on that of the church of St. Katherine, although the complexity of the structure is suggestive of later medieval roofs. Peter Grossmann adopts a similarly steep roof pitch with a simpler truss in his reconstruction of 2006 although his earlier reconstruction of 1969 suggests a more modest pitch (fig. 18).[53] The reconstruction proposed here adopts a simple truss, spanning eight meters, with a central post of 1.7 meters and a pitch of 23 degrees (figs. 13 [13] and 17).[54] The size of timbers used could have been 35 centimeters deep and 25 centimeters wide in section, or even smaller, with the trusses positioned 2.75 meter apart directly in line with the ground floor columns. Ten trusses would be sufficient to support the roof on the assumption that the trusses followed the intercolumniation of the nave and that the gable ends were constructed from masonry.

The trusses at the church of St. Katherine have bottom chords made of roughly circular sections of heartwood resting on timber plates that cantilever into the nave. They were visually linked with a now-lost timber cornice.[55] There is no reason to suppose that similar technology was not applied at the Red Monastery church. No early examples of timber roofs with hipped ends exist in Egypt: they all end in vertical gables. The western end of the Red Monastery church, reconstructed as a vertical gable, would have provided an opportunity for lighting the interior with at least one high-level window, a solution also used at the church of St. Katherine. (The supplementary question of whether the roof of the nave was raised above a clerestory is considered separately below.)

There is no evidence to be gleaned from the archaeological record as far as the method of waterproofing the roof over the nave of the Red Monastery church. The church of St. Katherine was originally roofed with lead sheets laid over timber planks.[56] Although the logistics of supplying lead sheet to Sūhāǧ were probably simpler than supplying it to the Sinai, and it is possible the original roof was sheathed in lead as at St. Katherine's, nevertheless, lead would have been costly, heavy, and unnecessary bearing in mind the low level of precipitation in Upper Egypt. What might the alternatives have been? The use of Roman-style pan tiles is nowhere attested in Egypt. This leaves as possibilities a timber-boarded roof on purlins, or battens over purlins, covered with a layer of mortar (which would require replacement on a regular basis due to cracking), or even a palm rib roof with a mud render (which may have been a more reliable and economical treatment).[57]

Would the internal structure of such a roof have been visible from within the church or was there an intermediate flat or coffered ceiling? Such a flat ceiling may have offered certain environmental advantages, giving a degree of thermal insulation to the interior and reducing the risk of birds roosting in the rafters. Yet in the case of St. Katherine's, the only extant parallel we have, the lower chords of the trusses had elaborately carved and colored timber facings applied to them that were obviously intended to be seen from below.[58] It is now believed not only that these trusses were exposed in their entirety but that their painted treatment extended to the purlins above them.[59] Such a polychromatic and

Sinai: The Church and Fortress of Justinian; Plates (Ann Arbor, 1973), pls. 82 and 83. Peter Grossmann disputes the identification of anything other than the lower beams of the roof as sixth century, asserting that the remainder of the structure is modern (pers. comm., March 2016).

51 P. Koufopulos and M. Myriantheos-Koufopoulou, "The Architecture of the Justinianic Basilica on the Holy Summit," in *Approaching the Holy Mountain: Art and Liturgy at St Catherine's Monastery in the Sinai*, ed. S. E. J. Gerstel and R. S. Nelson (Turnhout, 2010), 107–17 esp. plans 5 and 6.

52 Monneret de Villard, *Les couvents près de Sohâg* (n. 2 above), 2:98.

53 Grossmann, "Zum Dach" (n. 8 above), pl. 2.

54 I am grateful to Sam Price, Price and Myers Consulting Engineers, London, for calculating the dimensions of this roof truss.

55 Koufopulos et al., "6th Century Timber Roof," 567–68.

56 See George Forsyth's introduction in J. Galey, *Sinai and the Monastery of St. Catherine* (London, 1980), 57 and n. 7. A replacement eighteenth-century lead roof survived until 1911, when it was replaced with a corrugated metal covering.

57 P. Grossmann, "Ceiling" in *Coptic Encyclopaedia* 1:201–2, observes that roofs were often made of a layer of rushes, straw, or palm leaves with a layer of dry earth above, topped by a plaster finish.

58 Forsyth and Weitzmann, *Monastery*, 8. The present soffit dates to the eighteenth century and lies below the trusses, concealing their decorative facings.

59 Koufopulos et al., "6th Century Timber Roof," 567.

sculptural treatment of the roof would accord well with the dramatic color and figuration evident in the sanctuary of the Red Monastery church.[60] In light of this, the reconstructions of the roof proposed here show it exposed to view from below (fig. 13; see also below, at figs. 23 and 25).

How were the flat roofs covering the rest of the enclosed area of the church treated? Once again, no archaeological evidence exists for the use of flat tiles to span the distance between secondary timber structural elements placed above the main joists. The same possibilities described for the treatment of the nave roof also pertain to these locations. Until recently, flat roofs were constructed in rural Egypt traditionally using palm ribs covered with a layer of mud bricks (as rubble or whole bricks) laid in mud mortar with a final coat of mud render applied above. The efficacy of such roofs, however, does depend on adequate runoff for rainwater. In this respect there is only a single surviving limestone waterspout at the Red Monastery church, reused in the rebuilt west facade, seemingly insufficient for the roof to function effectively. By contrast, eight stone waterspouts survive at the White Monastery church. Perhaps the additional spouts required to make the roof function effectively were omitted in the second-phase rebuilding of the perimeter wall. Water ponding on the roof would eventually soak into its surface, creating significant additional dead loading and eventual collapse, no doubt hastened by the industry of termites.

The Nave Clerestory

Monneret de Villard has argued that for climatic reasons it would have been undesirable to light the nave with a clerestory, and that no parallels for such an arrangement exist in Christian Egyptian architecture.[61] He and Peter Grossmann both omit a clerestory from their reconstructions (fig. 18). Although a clerestory is evident in the church of St. Katherine's monastery there is little to prove the case from other churches of comparable date to those at the Red and White Monasteries. Other construction originally abutted the naves of both these churches on their southern sides. In the absence of a clerestory, small windows in the north and west facades (and perhaps windows in the western gable of the roof) would therefore have supplied the only natural illumination to the interior. The question of whether this delivered a sufficient level of light depends to a great extent on differing cultural perceptions and the amount of artificial illumination provided within the building. It can be argued that the church was intended to be essentially a dark place, lit almost entirely by a variety of metal or glass oil lamps either suspended or standing on the ground.[62] A clerestory would also have required a large amount of additional work and would have raised the section of the nave to a degree where it would have been more visible from outside the building. If the intention of the builders was to give the impression of a large pylon-like structure from the exterior, such a design might have detracted from this effect.

The absence of a clerestory, however, does create one major architectural difficulty relative to the central high-level niche on the sanctuary facade that recent conservation has proven to be an in-situ element of the late antique structure (fig. 19). Without a clerestory, this niche would sit above the bottom of the roof trusses and would be only partially visible if the trusses were left exposed. The high degree of elaboration of this niche, however, suggests that its creators intended it to be fully appreciated from the nave. Today, the minimal level of natural light inside the church without the provision of a clerestory seems insufficient for such a large structure, even in a culture where direct sunlight was abhorred and in an ecclesiastical context where light (including artificial light) had a strong symbolism. A series of clerestory windows has therefore been adopted for the reconstruction proposed here (figs. 13 [14], 17, 23, and 25), much as Somers Clarke provided in his reconstruction of the White Monastery church.[63] The design and spacing of such clerestory windows could be more or less complex. The use of rectangular or arched openings in a plain wall surface offers the simplest solution. More

60 The roof trusses of the church of Abū Sarǧa may also originally have been visible from the nave without a soffit. See P. Sheehan, *Babylon of Egypt: The Archaeology of Old Cairo and the Origins of the City* (Cairo, 2010), fig. 71.

61 Monneret de Villard, *Les couvents près de Sohâg*, 2:98–99. For the appearance of the clerestory at the church of St. Katherine's Monastery, see Forsyth and Weitzmann, *Monastery*, pls. 25 (exterior) and 43 (interior).

62 In this context, see D. Montserrat, "Early Byzantine Church Lighting: A New Text," *Orientalia* 64 (1995): 436 and n. 16, for a reference to the use of artificial lighting at the White Monastery church.

63 Clarke, *Christian Antiquities* (n. 5 above), pl. 48, figs. 2 and 3.

FIG. 19.
Carved limestone niche above central arch in sanctuary facade, 2012 (photo: A. Vescovo, courtesy of the American Research Center in Egypt)

complicated would be the use of windows framed by pilasters and a hood, similar to those within the clerestory of the sanctuary, perhaps set within a wall surface subdivided by pilasters relating to the positions of the roof trusses above. It is also possible that an alternating system of windows and blank niches was employed.

The proposed reconstruction opts for the simplest solution required to deliver a reasonable level of light within the nave, with a series of rectangular openings whose sills have been given internal chamfers to match the design of the other external windows in the church. Although no evidence of glazing survives in the archaeological record, it is entirely possible that the windows were glazed, as the use of windowpanes with circular or rectangular pieces of glass in basilicas in the Near East is well attested from the fourth

FIG. 20. One of the carved openwork blocks among the spolia within the trilobe portal (photo: author, 2014)

century onward.[64] There is also limited evidence for the possible use of stone window grilles in the church at some point in its history. Two spoliated decorative limestone blocks, reused in an assemblage within the later trilobe portal, have crosses within them that are carved through the full thickness of the block (fig. 20). Carved borders on two sides indicate that they were once part of larger grille assemblies. It is equally possible, however, that such blocks formed a section of a semitransparent screen or perforated balustrade and not a window.

The East End of the Nave

Four columns stand at the east end of the nave on the bema in front of the sanctuary (fig. 13 [2]), an architectural assembly considered to be part of the original late antique church. These columns have always posed a difficulty, however, for the spatial reconstruction of this end of the building since the central pair stand taller than those to either side of them (the last of the columns surrounding the nave). A variety of solutions to this problem, not equally satisfactory, are possible (fig. 21). Was the central pair of columns intended to be freestanding (fig. 21A) or were they integrated into the articulation of the sanctuary facade and aisles? The idea of two freestanding columns framing the doorway of a church is derived from the columns, named Jachin and Boaz, said to have flanked the portico of the Temple of Solomon in Jerusalem. Evidence that columns were used in this manner in Egyptian churches is, however, entirely lacking. The reconstruction of the Red Monastery church by Evers and Romero shows the central columns as freestanding, but the authors give no reasons for why this should be the case.[65]

The South Church at Ašmūnayn,[66] and the churches within the temples of Dendera, Medamud, and Luxor employ a placement of columns similar to that encountered at the Red Monastery church.[67] The White Monastery church is also presumed to have had such a composition, hidden today by later construction. These examples show that such columns were not treated as part of a "return aisle" but were considered to be a special feature. What they lack, however, is a surviving, fully articulated, facade against which the columns can be read. This is remarkably present at the Red Monastery church, where the careful positioning of the frontal columns in relation to the facade behind them suggests that they were part of a more complex architectural assembly physically integrated with this facade. For a brief moment in 1909, this reading of the facade and columns in tandem became physically possible owing to the Comité's removal of much of the later wall that stood in front of them, and prior to the building of a new enclosure wall in its place (fig. 22).[68] Monneret de Villard ignored this relationship in his drawings, but speculated that the columns supported a timber beam over which a cross was placed in the manner of a rood screen.[69] Such a beam may also have had wooden ties

64 M. O'Hea, "Glass in Late Antiquity in the Near East," in *Technology in Transition, A.D. 300–650*, ed. L. Lavan, E. Zanini, and A. Sarantis, Late Antique Archaeology 4 (Leiden, 2007), 233–48.

65 Evers and Romero, "Rotes und Weisses Kloster" (n. 7 above), fig. 76

66 Bailey, *Hermopolis Magna* (n. 44 above), 47 and pl. 89; Grossmann, *Christliche Architektur* (n. 14 above), pl. 58.

67 Grossmann, *Christliche Architektur*, pls. 63, 66, 68, and 71.

68 See Warner and Meurice, "Comité" (n. 10 above), 249–50, for the Comité's intentions for the presentation of the monument.

69 Monneret de Villard, *Les couvents près de Sohâg* (n. 2 above), 2:102–3.

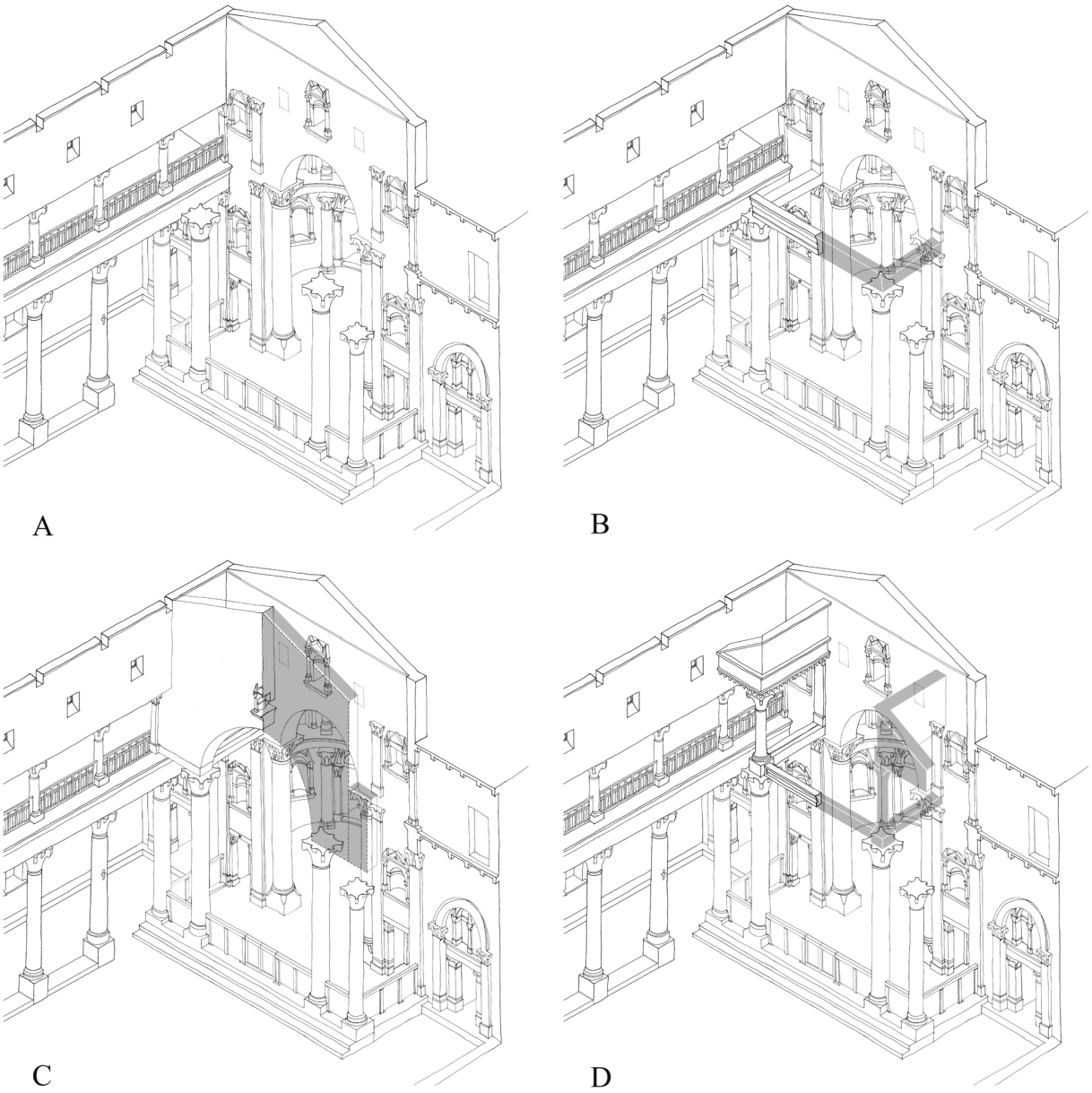


FIG. 21. Isometric reconstructions of the east end of the Red Monastery church showing hypothetical: **A** freestanding columns; **B** beam above columns tied back to facade; **C** triumphal arch; **D** split pediment over secondary order (drawing: author, 2014)

back to the sanctuary facade for lateral support, relating to the pilasters on the facade (fig. 21B). Even with these ties, however, this proposal does not explain the presence of an upper level of pilasters on the facade.

Further aesthetic and historical objections to the use of an isolated beam in this context can be raised. Because the late antique deployment of the arch to frame a holy object or person was so common, various alternative reconstructions of the churches of both the Red and the White Monasteries attempt to insert a large triumphal arch in front of the sanctuary facade to create a more pronounced architectural frame for the sanctuary (figs. 21C and 23). Somers Clarke reconstructed this arrangement at the church of the White

FIG. 22.
View of the east end of the Red Monastery church during the Comité's restoration of 1909–12 showing the relationship of columns to the sanctuary facade (unknown photographer; Istituto Nazionale di Archeologia e Storia dell'Arte, 66806)

Monastery, and considered a similar solution to have applied at the Red Monastery church.[70] In the case of the latter, owing to the difference in height between the two large columns *in antis* and those flanking the nave, as well as the tight spacing between them, it is difficult to reconstruct a convincing tripartite triumphal arch over these columns that does not result in an awkward junction with the gallery. Even a single arch would restrict the line of sight to the upper section of the sanctuary facade with its prominent central niche. One might add another aesthetic comment regarding this solution—namely that the continuity of the roof structure over the plane of the triumphal arch looks peculiar, and that in this case a flat soffit over the nave might have been adopted (shown in a transparent gray tone in fig. 23).

Any reconstruction of a triumphal arch in front of the sanctuary facade must also take into consideration a structural connection between these two features. This connection is implied by the pair of superimposed pilasters and capitals at high level on the facade to either side of the chancel arch (see below, fig. 28, elevation). These pilasters must have originally related to structural elements, such as beams or arches, bracing the triumphal

70 Clarke, *Christian Antiquities*, pl. 48, fig. 2.

FIG. 23.
Perspective reconstruction showing triumphal arch from center of nave, with shaded area representing possible flat soffit (drawing: author, 2014)

arch in an east–west direction (fig. 21C). Connections between the triumphal arch and the gallery would have been best achieved with beams directly above the floor level of the gallery. This would mean that any cornice lines pertaining to the gallery or the triumphal arch would have been mismatched in height. The plane of the masonry of the arch would also have to respond, in some way, to the articulation of the upper gallery. Assuming this had columns, pilasters would have had to have been positioned at the ends of the wall to relate to these columns (as shown in figure 23). The degree to which the plane of such a triumphal arch might have been perforated with openings is also a matter of conjecture: a single framed opening is shown in the

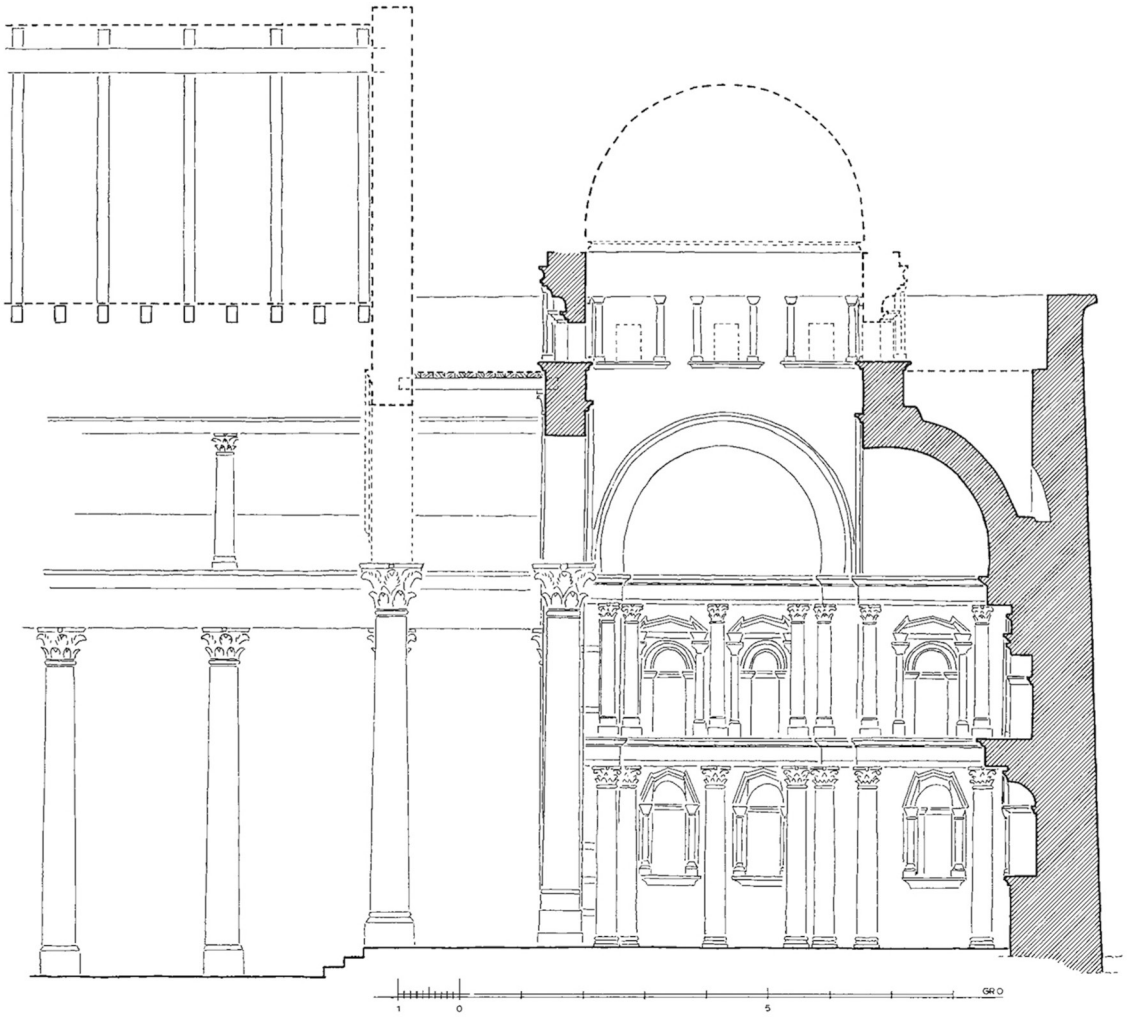


FIG. 24. East–west reconstructed section of Red Monastery church looking north showing east gable above large columns (drawing: Peter Grossmann, 2006)

perspective reconstruction mimicking the uppermost niche on the sanctuary facade.

Peter Grossmann suggested in his reconstruction of 2006 that the plane of the east gable of the roof should be moved west to align with the location of this triumphal arch, creating a small flat roof between the gable and the superstructure of the crossing of the sanctuary (fig. 24).[71] This proposal is valid only if one accepts that the most complex of all the niches in the church, on the central axis, was invisible from within the building. Furthermore, the bottom of this niche would have been level with the flat roof in front of it: a most unsatisfactory relationship. Grossmann's reconstruction also posits similarly complex niches ornamenting the other external elevations of the clerestory of the sanctuary. Tempting though it may be to create a scenario involving a ritual peregrination around the superstructure of the sanctuary, represented externally through a group of elaborate niches, it seems hard to justify in architectural terms.

There is, however, one other plausible alternative to the hypothesis that the two large columns at the east end of the nave supported an arch. And that is that they supported the two halves of a split pediment (figs. 21D and 25).[72] The columns could easily have carried a secondary order rather than an arch, and the ends of each

71 Grossmann, "Zum Dach" (n. 8 above), pl. 3.

72 My thanks to Fabio Barry for directing my attention to this alternative.

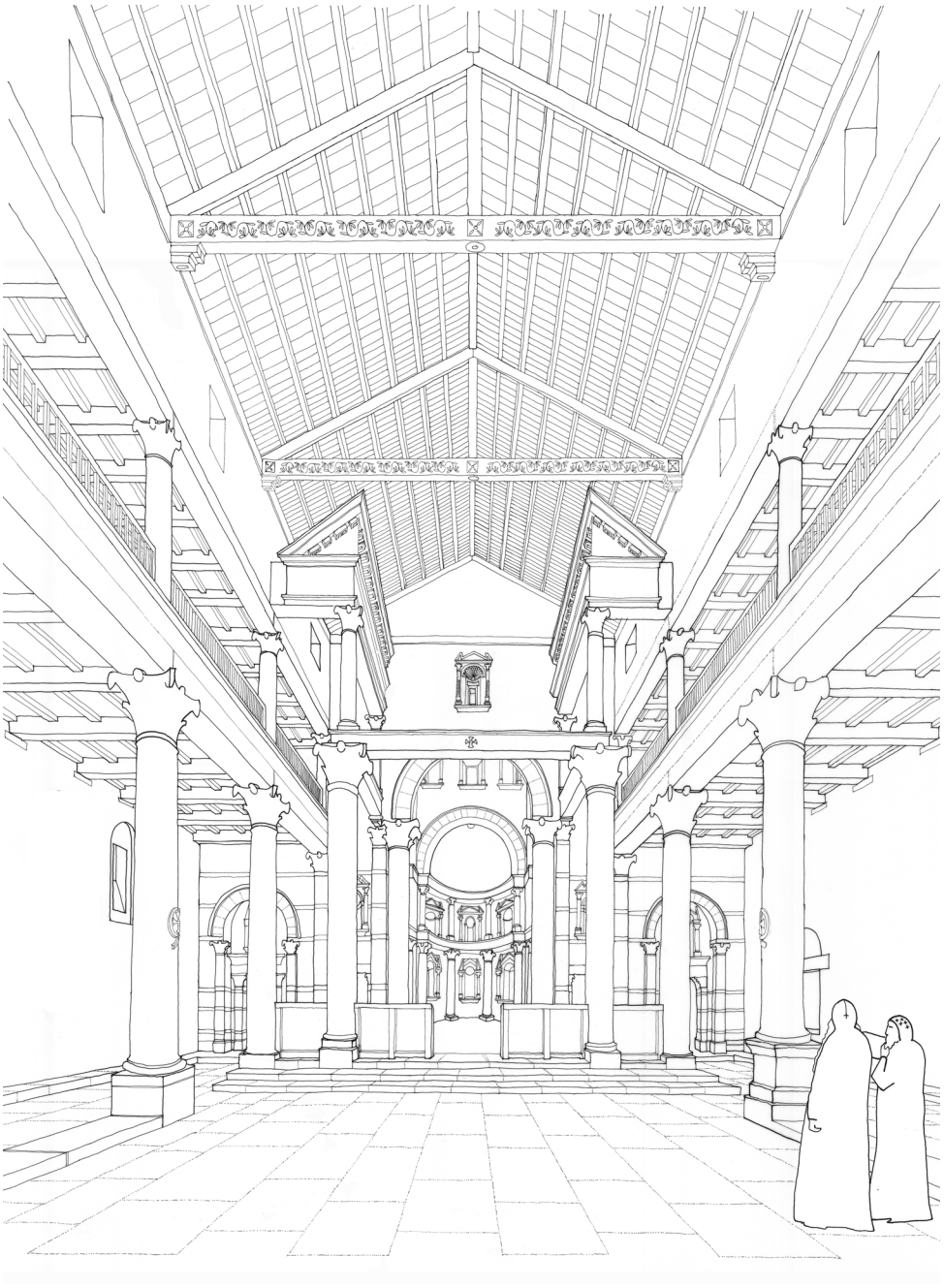


FIG. 25.
Perspective view of reconstructed nave of Red Monastery church looking east showing split pediment superstructure (drawing: author, 2014)

half of the pediment could have been structurally tied back to the sanctuary facade and the flank walls of the nave at high level by timber beams supporting their masonry. This solution may also have incorporated a beam between the large columns that would have provided structural bracing as well as a support for hanging polycandela, or other objects (although the beam would not have been a structural requirement). It creates great perspectival depth to the end of the nave, directed at the sanctuary and the elaborate high-level niche that links to the crossing of the sanctuary. Also evident is a much greater degree of transparency and layering than the alternative of a triumphal arch, allowing the sanctuary facade to be read much more clearly. Such a proposal is, more or less, a restatement at large scale of the most common architectural element articulating both

FIG. 26. A typical niche from the sanctuary (left) and the central part of the sanctuary facade with split pediment superstructure (right). Inner arches are shaded in gray tone (drawing: author, 2015)

the sanctuary and its facade: a niche with a semicircular arched hood, fronted and framed by pilasters or colonettes supporting a composite pediment (fig. 26).

Architectural corroboration for this hypothesis exists in many relevant contexts around the Mediterranean and Near East.[73] The concept of the broken lintel forming part of a screen wall in front of temple pronaoi, initiated in ancient Egypt during the Eighteenth Dynasty, gained great popularity in the Ptolemaic period, a popularity that was sustained up to late Roman times.[74] Broken pediments framing kiosks are common in the fictive architecture of Roman Third and Fourth Style wall paintings.[75] The same forms appear in the Nabataean architecture of Petra and Madāʾin Ṣāliḥ, as well as at late Roman sites such as Baalbek. An almost universal characteristic of such pediments is their articulation through elaborate cornices, especially those with modillions. One such loose cornice block, reworked from a piece of spoliated granite, still survives in the nave of the Red Monastery church today (fig. 27). The halves of the pediment could have been expressed in a great variety of ways, with different degrees of solidity and different spatial consequences. They may have been built into masonry boxes extending to the undersides of the trusses of the nave. They may have been angled in two directions, as in the style of the Palazzo delle Colonne in Cyrenaica,[76] or angled only in their forward plane facing the nave, in the manner of the second-century gate from Miletus. The latter alternative is shown in figures 21D and 25.

73 Summarized in M. Lyttleton, *Baroque Architecture in Classical Antiquity* (London, 1974).

74 See D. Arnold, *Temples of the Last Pharaohs* (New York and Oxford, 1999), 303–4.

75 See, for example, paintings in the Corinthian oecus of the House of the Labyrinth, Pompeii.

76 Cf. G. Pesce, *Il "Palazzo delle Colonne" in Tolemaide di Cirenaica* (Rome, 1950), fig. 16 and pl. 10.

FIG. 27. Reworked granite cornice block with coffered modillions (photo: author, 2013)

Although the range of possibilities for the architectural treatment of the east end of the nave of the Red Monastery church in the late antique period may seem bewildering, it is clear from a survey of previous reconstructions that insufficient attention has been paid to the structural vocabulary of the sanctuary facade and its relationship to the two large columns that stand before it. Although precedents do exist in late Hellenistic architecture for the use of pilasters as a kind of wallpaper, it is far more likely that the orders expressed on the sanctuary facade of the church were physically tied to the columns *in antis*. The proposed reconstructions showing triumphal arches above these columns fail to solve this relationship in a convincing three-dimensional manner.

Screening the Sanctuary

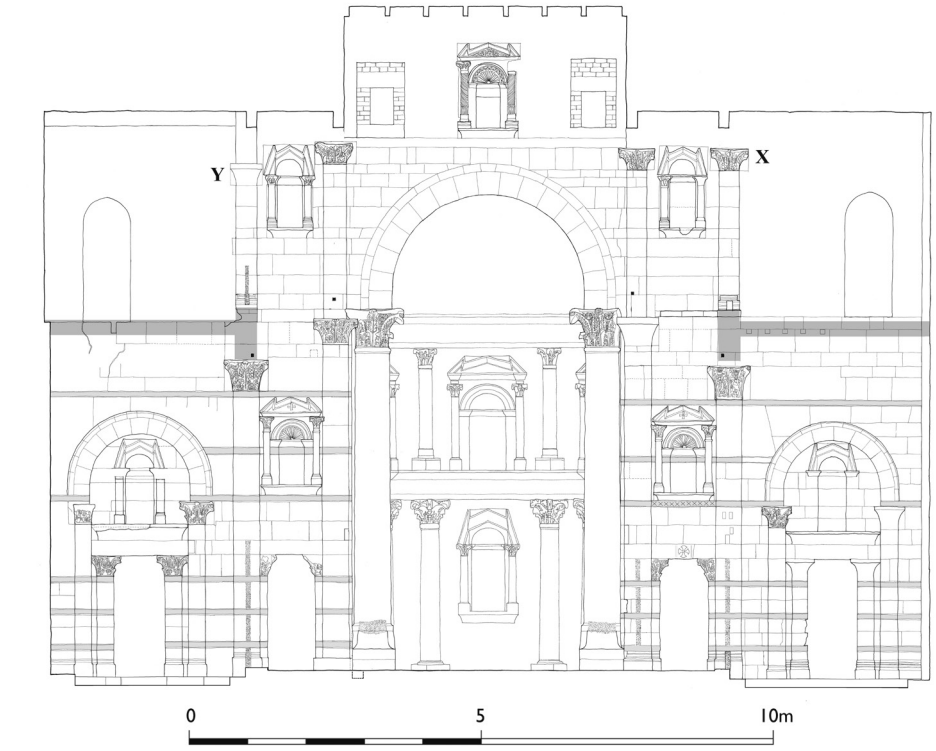
The bema, together with its columns, was not the only way in which the physical division between the nave and the sanctuary was expressed. There is evidence for multiple screens, or balustrades, on all sides of the bema in the form of slots made in column bases, postholes cut in the border of the bema, and grooves chiseled into the sanctuary facade on the return alignments of the steps (figs. 28 and 29). Although some of this evidence is apparent on the 1962 survey plan of the church, later paving or plaster obscured much of it. Only in 2013, after a variety of conservation interventions had taken place,[77] could a clearer interpretation of these traces be made. Owing to the extensive rebuilding of the front of the sanctuary of the White Monastery church, any meaningful parallel to the situation regarding screen emplacements there cannot be made. The triconch church at Dendera, however, has signs of screens running in both east–west and north–south directions, and these may have been part of the original design.[78]

How high was the screen around the front and sides of the bema at the Red Monastery church? Elizabeth Bolman has identified three distinct types of screen used in late antique churches in Egypt: the low balustrade, the templon model, and the high wooden screen.[79] As there are no traces of fixation in

77 For a summary of the work carried out in 2013, see N. Warner, "'All Hands on Deck!' Architectural Conservation and Presentation at the Red Monastery Church, 2011–2014," *Bulletin of the American Research Center in Egypt* 206 (2015): 6–22.

78 See Grossmann, *Christliche Architektur*, pl. 63.

79 E. S. Bolman, "Veiling Sanctity in Christian Egypt: Visual and Spatial Solutions," in *Thresholds of the Sacred: Architectural, Art Historical, Liturgical, and Theological Perspectives on Religious Screens, East and West*, ed. S. E. J. Gerstel (Washington, DC, 2006), 73–104.



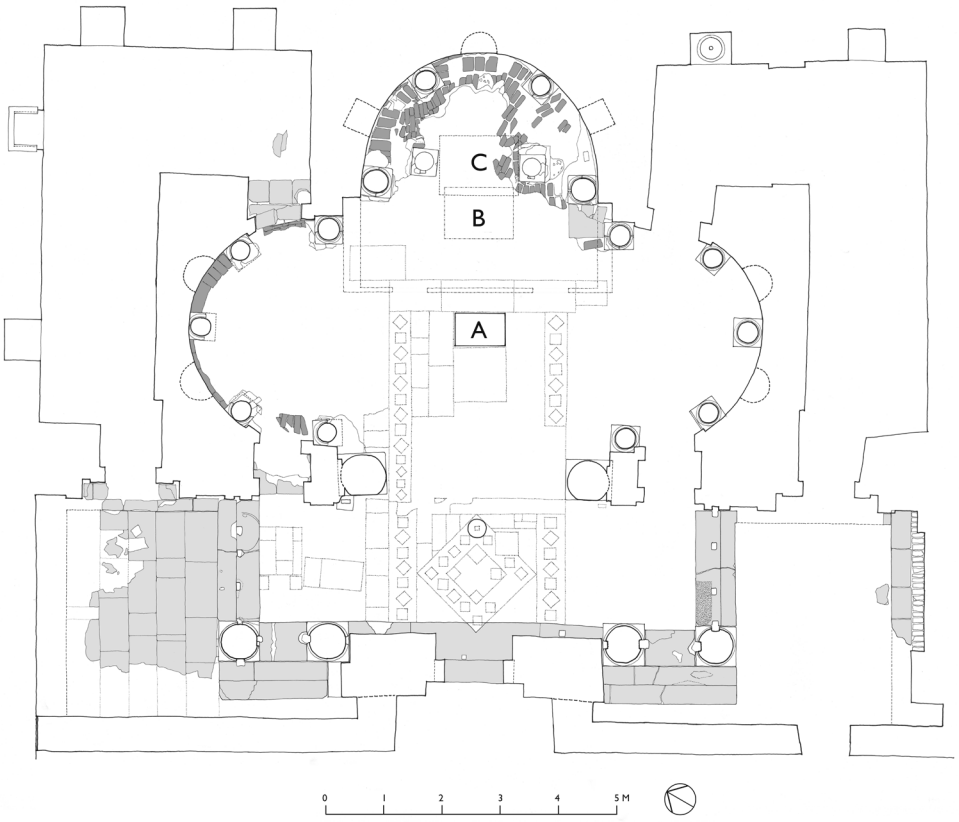


FIG. 28.
Detail elevation and plan of the sanctuary of the Red Monastery church. The elevation shows the position of the missing galleries in gray tone and the east conch in gray line. The plan shows surviving limestone steps and earlier flooring in pale gray tone, remains of the mud-brick blocking walls and sub-floor in dark gray and the destroyed opus sectile floor in dotted line. **X** position of late antique capital installed in 1909; **Y** position of modern capital installed in 2012; **A** reconstructed location of original altar; **B** 1905 altar; **C** 1912 altar (drawing: author, incorporating details recorded by Somers Clarke in 1906, the Darmstadt Technical University in 1962, and Gillian Pyke in 2013; a full archaeological examination of the area was not possible in 2013 owing to local constraints)

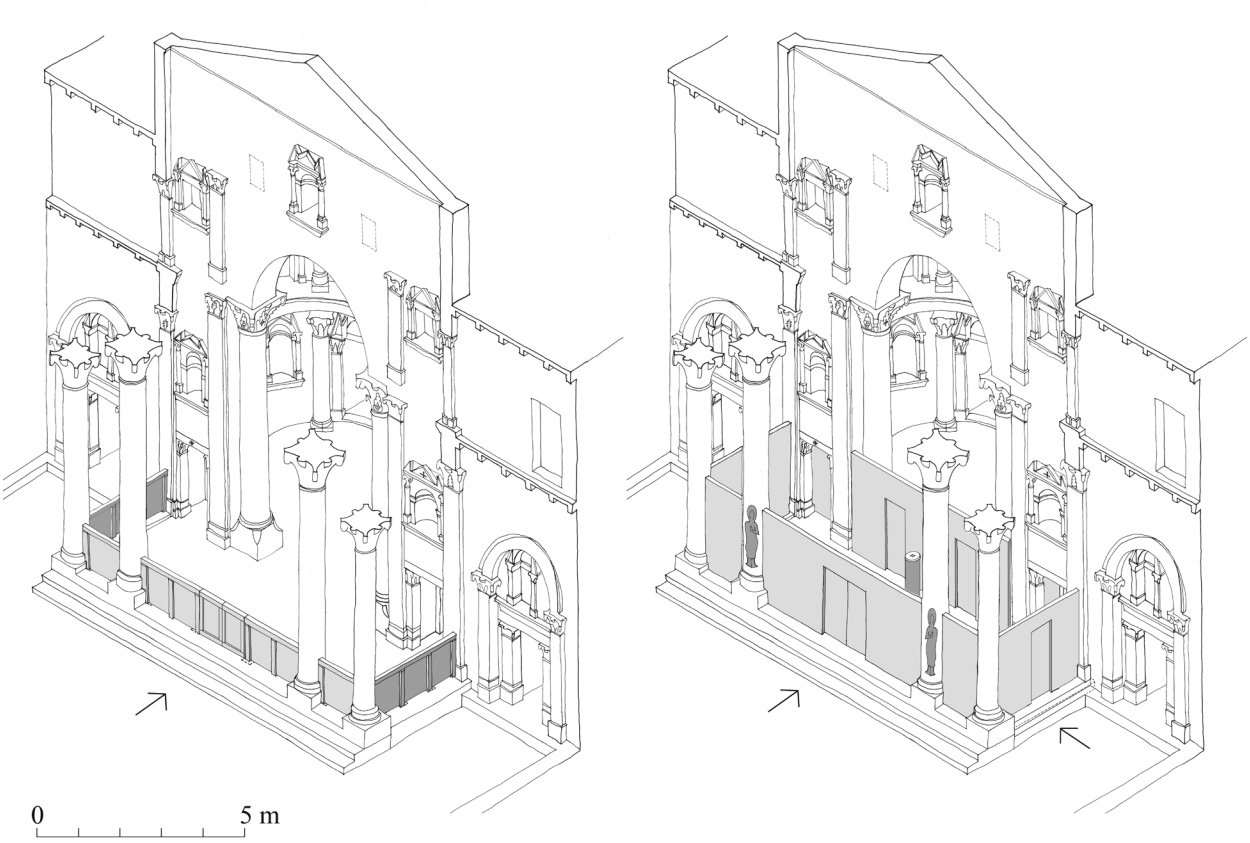


FIG. 29. Isometric reconstructions of screens in front of sanctuary. Left: low stone balustrades and frontal access (late antique period). Right: tall timber screens with side steps modified for lateral access (medieval period). Note figural paintings on column shafts facing the nave (drawing: author, 2013)

the columns fronting the bema at the Red Monastery church that would have supported a templon beam, this alternative has been discarded for the reconstruction of the screen at the Red Monastery church. Although much of the evidence for the screen indicates it was above head height (discussed further below), it is probable that this tall screen replaced an earlier low screen and simply wiped out any traces of the former arrangement. Low balustrades, approximately one meter high, are a common form of screening in late antique churches and can be made of a variety of materials including stone panels (*cancelli*).[80] Such a low balustrade is shown in the perspective reconstructions of the east end of the nave provided here (figs. 23 and 25). Later construction masks the position of the screen between the two columns at the center of the bema, but it is certain that a central opening was located here on the main axis of the church. The monolithic blocks on the return alignments of the bema clearly show that they were only later cut down to form steps (fig. 28). This means that there was no access to the bema from its sides in the original design of the late antique church. *Cancelli* may not have provided the only form of spatial separation around the bema. The additional or complementary use of curtains may also be imagined. *Vela* are frequently represented in the wall paintings on both the sanctuary and its facade, and ancient Panopolis, like present day Akhmīm, was famous for its production of high-quality textiles.

The Sanctuary Facade

The sanctuary facade has a number of elements whose presence requires an architectural explanation (fig. 28).

80 P. Grossmann and H.-G. Severin, "Cancelli," *Coptic Encyclopedia*, 1:200–201.

Perhaps the biggest query concerns the use of pilasters that do not presently relate to any structural elements or entablature. These occur in the superimposed orders immediately to either side of the chancel arch. The most satisfactory suggestion is that timber beams once connected the pilasters to a structure west of the facade (fig. 21). The facade cannot be understood in isolation from what is behind it, or in front of it. The height of the nave colonnade and gallery is imprinted upon it in the form of pilasters, and the two side doorways are positioned axially along the aisles of the nave. The central, or chancel, arch on its monolithic columns frames the most sacred part of the church. Tall pilasters of matching height flank these columns, and are directly related in size to the columns *in antis* on the edge of the bema. Between these pilasters and the lines established by the aisles of the nave rise full-height vertical recesses containing, at ground level, openings into the north and south conches of the sanctuary and two tiers of niches above them. The distribution of niches on the facade follows a roughly pyramidal arrangement, culminating in the high-level niche above the chancel arch.

One other important feature that occurs across the entire width of the facade below the level of the original galleries is horizontal wooden banding, which is set into the face of the wall and respects all its projections and recesses (fig. 12). There are a total of six bands, all of them located below gallery level. The bands differ, however, in their vertical distribution: the lower three bands are related to the bottom, middle, and top of the pilasters flanking the side entrances into the sanctuary while the upper three bands relate to the bottom, middle, and top of the niches that stand above these entrances. As the bands wrap through the sanctuary facade into the space of the triconch beyond they also relate to structural components within this space. The uppermost band (fig. 12, line B) not only coincides with the position of the bases of the large pilaster capitals under the gallery (and therefore with the level of all the tops of the putative column shafts of the nave) but also corresponds with the heads of the niches of the upper tier of the sanctuary. Another band (fig. 12, line C) aligns with the lintel of the entablature above the lower tier of columns in the the sanctuary: a key architectural relationship. A third band (fig. 12, line D) relates to the level of the bottom of the lower niches in the sanctuary. The most important example of an interrelationship between the sanctuary and the nave, however, is not represented by a band but by the upper cornice of the sanctuary that would have directly corresponded to the missing cornice of the nave above its colonnade (fig. 12, line A). Such careful placement of the banding, with respect to the scale not only of the nave aisles but also of the sanctuary itself, must have provided the builders of the church with a set of clear horizontal regulating lines that governed the internal elevations of the entire structure. In this context it should be noted that at least one band might have continued around the edges of the aisles of the late antique church, before the medieval reconstruction took place. A clear parallel for a horizontal band at eye level can be seen in the walls of the nave of the White Monastery church.

Almost all the timber used in the banding dates to the 1909 restoration of the church, but the bands were always an expressed feature of the facade. The surviving painted plaster decoration respects the borders they create. The bands may once have been carved and painted with more elaborate decoration, as seen in the north and south churches of Bāwīṭ and at the White Monastery church (fig. 30).[81] Decorative limestone bands of comparable width also survive at the Red Monastery church on the south portal. The fact that the bands are confined to the lower, more visible, areas of the facade might confirm they were decorated, but in the absence of any conclusive proof, plain bands are shown in the reconstruction. The wooden bands have also been interpreted as a measure to improve the earthquake resistance of the masonry but, as they are not cross-stitched to any timbers running in the opposite direction, this hypothesis seems unfounded.[82]

The policy of the Comité in their restoration of the sanctuary facade in 1909 was to introduce abstracted limestone pilaster capitals where they were missing. These have all been replaced in the paper reconstruction by sculpted capitals. One loose antique pilaster capital was, however, reinstated incorrectly during the restoration (fig. 28, marked X on elevation). Monneret de Villard demonstrated that this capital should have

81 My thanks to Theo Gayer-Anderson for drawing my attention to this hitherto unnoticed fragment of the White Monastery church's original fabric. For other examples of carved timber banding deriving from Bāwīṭ see M.-H. Rutschowscaya, *Catalogue des bois de l'Égypte copte* (Paris, 1986), 126.

82 For Egyptian examples of the late antique use of timber lacing to improve earthquake resistivity, see the structures of Karanis in the Fāyyum.

FIG. 30. Wooden band with carved decoration under a high-level niche in the south hall of the White Monastery (photo: author, 2012)

been positioned at a level lower than its counterpart to the left of the niche in order to lie below the structure of the gallery roof, and this position is shown in the reconstructed elevation (fig. 17).[83] Two pilaster bases are also missing from the facade, and these are also reinstated, sitting directly above structural ties to the columns to the west. The present appearance of the arched doorways in the sanctuary facade at first-floor level connecting the missing north and south galleries with side rooms is modern. These doorways are given greater architectural prominence in the reconstruction by replicating the scale and form of the door openings to either side of the chancel arch, but this is a purely speculative embellishment.

Another major issue for the reconstruction of the sanctuary facade is the link between the clerestory of the sanctuary and the nave. At present, a single original and highly elaborate niche with a small aperture connects the two spaces (fig. 19). Two small rectangular openings, created during the 1909 restoration, flank this niche.[84] These two openings relate to small niches on the interior of the sanctuary clerestory but have no external articulation at present. Did they ever exist, and if so were they framed architecturally in a manner similar to the central niche? Although these questions cannot be resolved, the central opening on the sanctuary facade indicates, by its height relative to the clerestory windows of the sanctuary, a primary architectural relationship between this niche and the nave of the church. The fact that the niche on the nave side of the sanctuary crossing is lower and smaller than those on the other elevations of the clerestory is difficult to comprehend except as a result of this relationship. The reconstruction of the facade shows the niches flanking the central niche in dashed lines to indicate their uncertain status (fig. 17).

The Triconch and Its Side Rooms

The remarkable degree of preservation of the conches of the sanctuary (fig. 13 [3]), including their semidomes, leaves little to consider except the position of the altar within the triconch and the nature of the roof—subjects that are addressed separately below. Some changes have occurred due to conservation works over the past century, but these do not significantly affect the architecture of the original space. What still remain unclear are the details of the woodwork. It is

83 Monneret de Villard, *Les couvents près de Sohâg,* 2: fig. 114.

84 The survival of the central niche in situ, despite the replacement of the arch below it in 1909, is confirmed by the continuity of painted plaster layers on and around its inner face.

possible, for example, that the originals of the curved timber beams of the entablature above each tier of columns had carved decoration, similar to that found at a smaller scale in the White Monastery church (fig. 30).

Another query relates to the provision of doors. Did the openings on the west side of both the north and south conches leading to the bema originally have doors? If the space under the chancel arch remained open, as seems likely in the earliest phases of use of the church, there would have been no need for doors at all. Recesses for doors do exist in the depth of the openings, but the curvature of the conches in plan in relation to the orthogonal facade wall means that the doors, of necessity, would have been made as pairs of unequal leaves. Such doors were, in fact, installed as part of the conservation work completed in 2014. There seems less doubt that the matching openings on the eastern side of the north and south conches, leading to the square domed side chambers, had doors since these rooms, often referred to as pastophoria, presumably contained separate functions related to the liturgy.[85] The presence of early paintings in both of the long side chambers, on the walls that back onto the triconch, indicates that these rooms were a part of the late antique structure (fig. 13 [4] and fig. 4). Elliptical inclined vaults currently cover the long chambers, but these are clearly later constructions and are discussed below. Such elliptical vaults, which can be built without timber centering, probably replaced either semicircular barrel vaults or even flat timber floors.

The Sanctuary Floor and Altar

There is no physical evidence for the treatment of the floor or the location of the altar within the sanctuary of the early church. A later opus sectile floor once extended from the sanctuary to the front edge of the bema (fig. 28), and this is discussed below. A central location for the altar within the triconch is considered more likely than the only possible alternative location—on the projecting platform of the bema in front of the line of the sanctuary facade—but it is even possible that there never was a solid masonry altar in the church. A fifth-century wooden altar table survives from the church of Abū Sarğa in Old Cairo, proving that liturgical fittings of this period may have been moveable.[86] Whether a ciborium framed the altar is also unconfirmed by archeological investigation. In view of these uncertainties the three-dimensional reconstruction drawings presented here show neither altar nor ciborium.

The Sanctuary Roof

The relatively small size of the crossing of the sanctuary of the Red Monastery church (4.54 meters squared) makes a number of roofing solutions possible for this area, and suggests that there was no pressing reason for any structural continuity with the roofing system adopted for the nave. At least four completely different options may be envisaged for the roof over the crossing: a flat timber structure, a pitched or domical timber structure, a masonry dome with pendentives, and a masonry dome with squinches. The arguments for and against these varied solutions are set out below, with one important caveat: neither the corpus of archival photographs of the church nor the records of the 1909 restoration provide detailed information about the clerestory of the crossing. Thus it is difficult to establish whether all the spaces flanked by paired pilasters in the clerestory were originally windows, or whether only the central unit on each side was open, being flanked by niches. Even the size of the windows is uncertain, as the present openings date to the 1909 restoration: the windows may have been considerably smaller than their internal framing, as indicated by Peter Grossmann in his 2006 reconstruction (fig. 24). Furthermore, no original pediments above these window/niche units have survived. Their overall design strongly suggests the use of pediments, however, and these are shown in the reconstruction (fig. 31).

A TIMBER STRUCTURE

Undoubtedly the easiest method of roofing the sanctuary would have been to use a flat timber beam construction. This could also have had a secondary coffered ceiling beneath it, whose design was related to the tripartite division of each elevation of the clerestory (fig. 31, left). Aesthetic arguments against this solution are that the roof would have appeared as a clumsy box

85 It is not possible to state, with any certainty, which of the rooms was the prothesis and which the diakonikon. I am grateful to Father Emanuel Fritsch for sharing his thoughts on this subject with me.

86 Now in the Coptic Museum (inv. no. 1172). For illustrations, see G. Gabra and M. Eaton Krauss, *The Treasures of Coptic Art in the Coptic Museum and Churches of Old Cairo* (Cairo, 2007), 195.

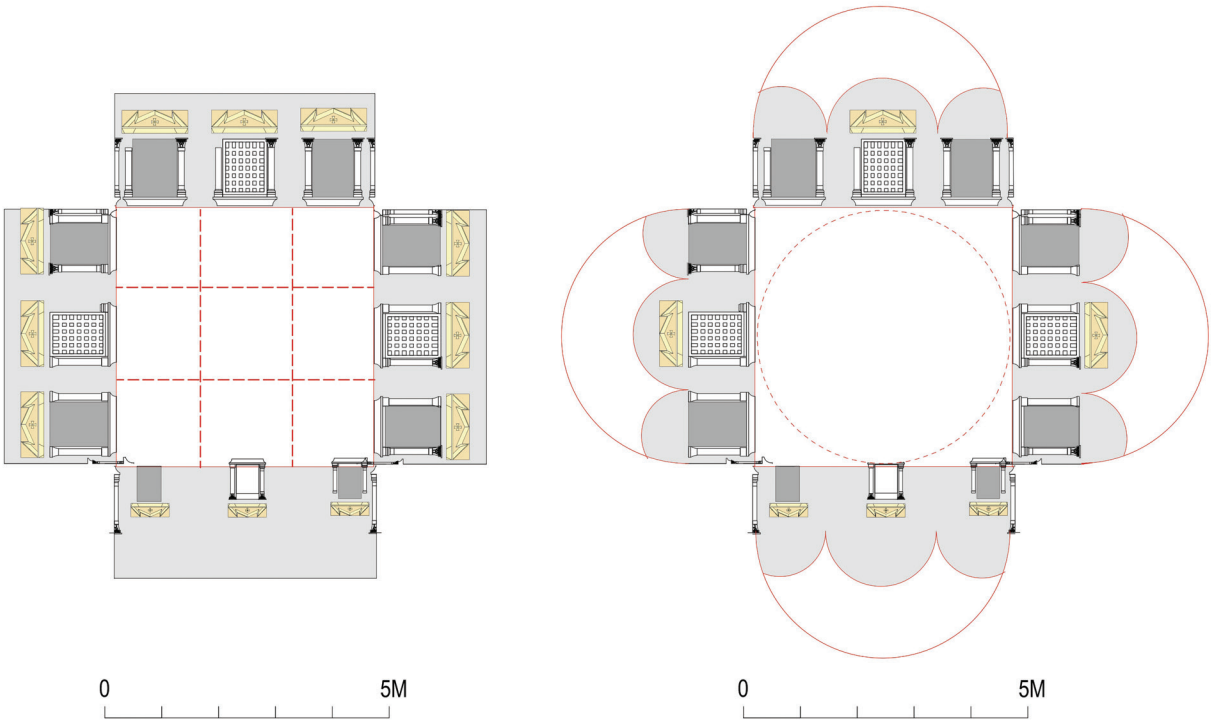


FIG. 31. Reconstructed ceiling plans of the sanctuary crossing with fold-out elevations of clerestory. Left: flat roof with possible subdivisions and pediments over all windows/niches. Right: composite dome with conical squinches and pediments over central windows (drawing: author, 2014)

on the exterior set against the eastern gable of the nave roof, and that the architectural solution of a flat ceiling militates against the prevailing domed forms expressed elsewhere in the architecture of the sanctuary. More complex timber roofs could be pitched: either as a continuation of the nave roof, as shown in the reconstructed section by Monneret de Villard (fig. 18), or as an entirely separate element. In the case of the latter, the roof could be octagonal, resting on diagonal cross-beams, or even pyramidal,[87] and the structure left exposed[88] or hidden with a flat timber ceiling as Monneret de Villard proposed.[89] Once again, aesthetic objections might be raised against the use of octagonal or pyramidal forms in this context, but such solutions are clearly possible and easy to achieve.

The timber dome has a long tradition of use in the Near East that has been extensively documented.[90] Lighter than its masonry counterparts, the wooden dome could be easily set over less substantial supporting walls and high clerestories. It could also have a variety of surface treatments and sectional properties, including the use of double-shell construction. There is strong evidence to suggest that important Christian contexts, such as the church of the Holy Sepulcher in Jerusalem, were roofed with wooden domes as early as the fourth century. The symbolic association of the dome (whether made of wood or masonry) with triconch plans is well attested from pre-Christian times and its use continued into the Christian period.[91] If the crossing of the Red Monastery church had such a dome, it would certainly have possessed a distinguished lineage.

87 Grossmann, "Die entdeckten Kirchenbauten" (n. 8 above), fig. 3.

88 S. Guyer, "Rusāfah," in *Archäologische Reise im Euphrat- und Tigris-begiet*, ed. F. Sarre and E. Herzfeld, vol. 2 (Berlin, 1920), 10–11.

89 Monneret de Villard, *Les couvents près de Sohâg*, 2:75.

90 E. B. Smith, *The Dome: A Study in the History of Ideas* (Princeton, 1950), chapter 2.

91 See ibid., 120–24, for a discussion of domes placed over triconch structures.

A MASONRY STRUCTURE

Some commentators, such as Somers Clarke, have disparaged on structural grounds the idea that any kind of masonry dome existed over the sanctuary, suggesting that the clerestory would never have been able to withstand the stresses imposed by a dome.[92] Three points can be made in this context: the first is that the triconch of Dendera must have had a dome, judging from the circle inscribed on the adjacent setting-out drawing.[93] The second is that it is likely that the entire roof around the nave and sanctuary was flat, completely covering the semidomes of the triconch (presently visible). This would have provided additional lateral stability to the outward forces exerted by a dome. The third is that the clerestory may have been buttressed. Furthermore, in view of the fact that a rather poorly constructed brick dome did survive in this location for a considerable length of time before its demolition in 1909 (fig. 6, to right of plan 3), it seems quite possible for a dome to have stood over the sanctuary without risk of failure (fig. 13 [15]).

If a masonry dome did exist over the crossing, what was the nature of its zone of transition? The simplest method of negotiating the geometrical shift from square to circle in plan would be to create an octagonal base for the dome by bridging the corners of the clerestory with a trabeated element of stone or wood set at 45 degrees to the perimeter walls. This method would also establish a clear architectural relationship between the openings in the eastern corners of the clerestory and their superstructure, but it is not a particularly elegant form of transition. A more developed alternative would rely on pendentives or squinches.

Domes with continuous spherical pendentives have a well-documented pedigree in Egypt going back at least to the Ptolemaic period. They also appear prominently in treatises on geometry and stereometry first composed in the first century CE.[94] Physical examples, executed in mud brick, fired brick, and stone, survive in a variety of contexts, including tombs, temples, and even houses. They also exist in the Red Monastery church, covering the small square rooms to either side of the sanctuary at ground level (fig. 32). The use of such a dome over the sanctuary itself is, however, problematic. This is because the pendentives would have to spring from a point above the top of the pilasters around the clerestory windows, and the resulting overall height for a semicircular dome would be considerable: higher than the ridge of the roof over the nave. This added height would increase significantly the external thrust of the structure, requiring the introduction of buttresses. The stubs of buttresses can, in fact, still be seen on the northeast and southeast corners of the clerestory today, though their date is unknown. The same objection would apply to a dome placed above a ring supported by pendentives.[95]

The question of whether squinches might have been used in a dome over the crossing has been complicated by earlier interpretations. Strzygowski believed that the arched squinches he saw prior to the restoration of the triconch in 1909 were original late antique elements (fig. 33).[96] This was certainly not the case, but the question remains whether an earlier dome on squinches might have been located here. In his *Early Muslim Architecture*, Creswell devotes a section to the squinch before CE 700 that includes reference to the "alleged early squinches at Sohag."[97] Analyzing all known early examples of this form, Creswell concluded that the arched squinch was absent in Egypt and North Africa until the late Fatimid period. Like others, he believed the sanctuary of the church was roofed in timber and that the clerestory had alternating arched window openings that were blank in the corners (fig. 34). Monneret de Villard, for his part, rationalized the tight grouping of the openings in the southeast and northeast corners of the clerestory by using squinches above these elements to create clear architectural units. He looked to Europe for parallels and found them in the squinches over clusters of columns in Romanesque architecture.[98]

92 Clarke, *Christian Antiquities*, 164 and 168.

93 Grossmann, *Christliche Architektur*, 444; R. Boutros, "L'étude architecturale de la basilique chrétienne de Dendara," *Études coptes* 11 (2010): 89.

94 McKenzie, *Architecture* (n. 29 above), 322–28.

95 See ibid., figs. 541 and 542 for diagrams showing the construction of domes with continuous or supporting pendentives.

96 J. Strzygowski, *Kleinasien, ein Neuland der Kunstgeschichte* (Leipzig, 1903), 112–13; idem, "Die persische Trompenkuppel," *Zeitschrift für Geschichte der Architektur* 3 (1910): 10–11.

97 K. A. C. Creswell, *Early Muslim Architecture: Umayyads, Early ʿAbbāsids and Ṭūlūnids*, vol. 2, *Early ʿAbbāsids, Umayyads of Cordova, Aghlabids, Ṭūlūnids, and Samānids, A.D. 751–905* (Oxford, 1940), 101–18, esp. 114–16.

98 Monneret de Villard, *Les couvents près de Sohâg,* 2:75–76, pls. 117 and 118.

FIG. 32. View of the pendentive vault over the small north side chamber (photo: A. Vescovo, 2012, courtesy of the American Research Center in Egypt)

Seen in the context of the original architecture of the Red Monastery church, the search for parallels in Romanesque constructions seems anachronistic and, indeed, unnecessary. As Creswell points out, the conical squinch was employed in the Near East from a very early date: the third century CE.[99] Its deployment (perhaps by eastern craftsmen) has also been documented in the Honorian phase (401–2) of the Aurelian walls of Rome.[100] It seems unlikely that its route of transmission would have bypassed Egypt. In Middle Egypt, Monneret de Villard himself recorded conical squinches made of mud brick at the site of Anṣinā, adjacent to Antinoopolis, but dated them to after the seventh century (fig. 35).[101] This is not the only place where such a feature has been discovered, used in conjunction with a composite dome that springs from lateral arches

99 Creswell, *Early Muslim Architecture,* 2:102–5 for the squinches of Firuzabad.

100 L. Cozza, "Osservazioni sulle Mura Aureliane a Roma," *Analecta Romana Instituta Danici* 16 (1987): 25–52 The best examples are found in Tower 15, Sector B, east of the Porta Pinciana—the "Turris Omnium Perfectissima."

101 A site known to Somers Clarke and Monneret de Villard as "Medina," where the remains of another (badly damaged) mud-brick triconch church have been recorded. See Grossmann, "Die entdeckten Kirchenbauten" (n. 8 above), pl. 2 and idem, *Christliche Architektur* (n. 14 above), fig. 139. Another example of the conical squinch at Anṣinā can be seen in P. Grossmann, *Mittelalterliche Langhaus-Kuppelkirchen und verwandte Typen in Oberägypten: Eine Studie zum mittelalterlichen Kirchenbau in Ägypten*, Abhandlungen des DAIK Koptische Reihe Band 3 (1982), pl. 56b.

FIG. 33.
View of an arched squinch from the clerestory of the Red Monastery church sanctuary prior to removal in 1909 (unknown photographer; Istituto Nazionale di Archeologia e Storia dell'Arte, 66818)

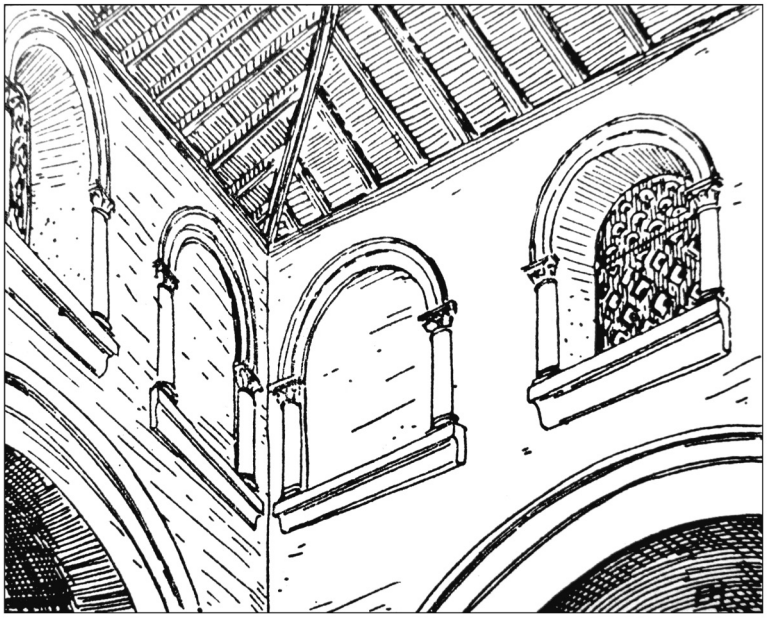


FIG. 34.
Reconstruction by Samuel Guyer of the clerestory of the Red Monastery church sanctuary with arched windows and niches and a pyramidal roof (from F. Sarre and E. Herzfeld, *Archäologische Reise im Euphrat- und Tigris-begiet, 1911–1920* [1920], 4: pl. 122.)

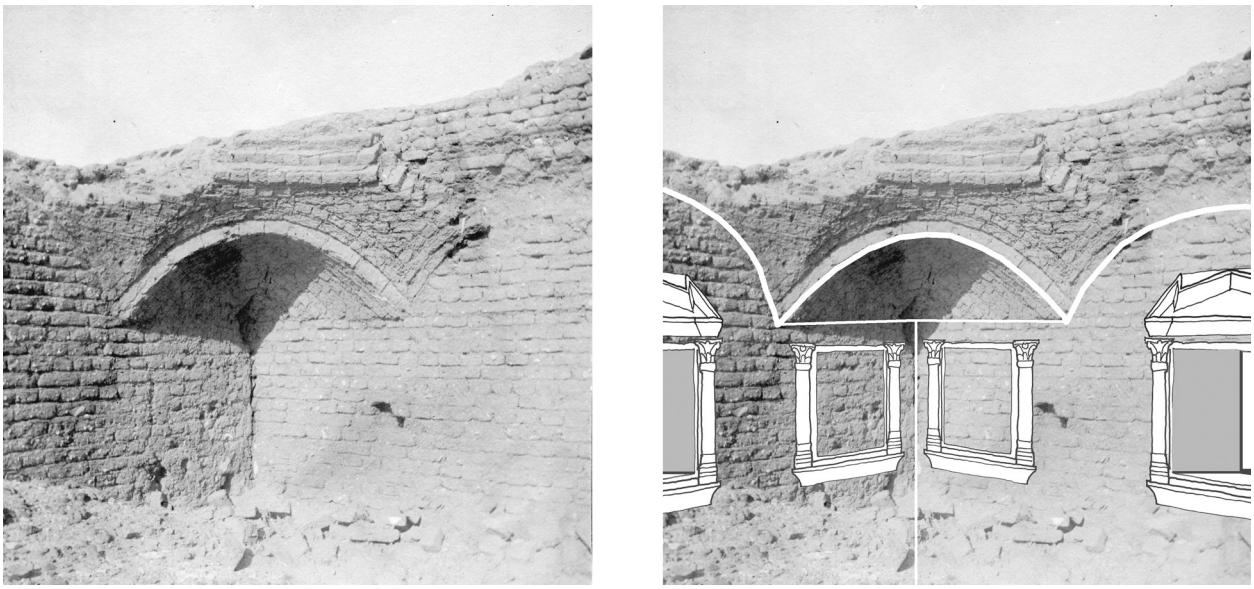


FIG. 35. Left: conical squinch and composite vault from Anșinā. Right: the same, but with superimposed reconstructed niches and windows of sanctuary clerestory at Red Monastery church (photo: Monneret de Villard; Istituto Nazionale di Archeologia e Storia dell'Arte, 67953; digital manipulation by author, 2012)

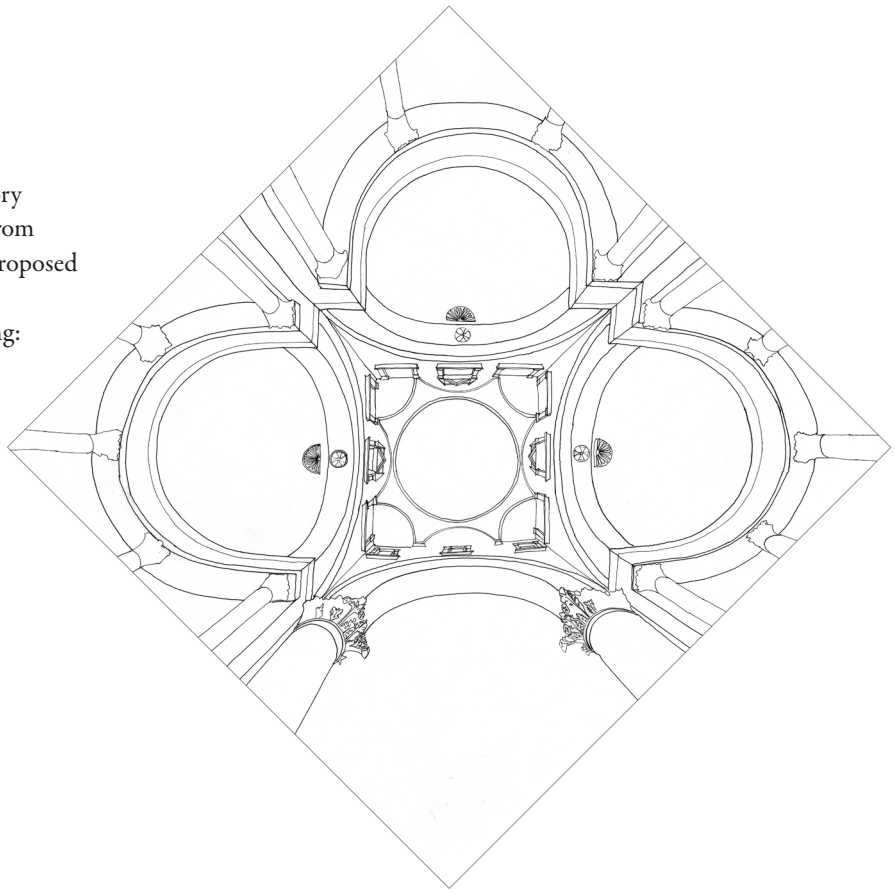


FIG. 36. Sketch of clerestory and dome, seen from below, showing proposed composite dome structure (drawing: author, 2013)

as well as above the squinches. In his excavations at Bāwīṭ, Jean Clédat uncovered a room (Chapel 43) with a dome resting on conical squinches that he dated to the eighth century.[102] Beyond the Nile Valley, at the necropolis of al-Bağawāt in the Kharga Oasis, numerous other complex methods of mud-brick vault and dome construction are also apparent, probably dating to between the fourth and sixth centuries. Could such a system of composite vaulting have been employed at the Red Monastery church? If the construction date for the church is posited as being between the mid-fifth and mid-sixth centuries this broadly corresponds with the current dating for al-Bağawāt, so the answer to this question seems positive.[103] Such a structure would have related well to the disposition of openings and niches in the clerestory below, and would have had a considerable aesthetic impact. Although it is obvious that no definitive answer exists at present to the question of how the sanctuary crossing was roofed, the composite method of vaulting using conical squinches is proposed in this reconstruction (figs. 31 [right], 35, and 36).

The South Hall and Its Dependencies

Thus far we have tried to reconstruct the appearance, at the time of their initial construction, of the most important spaces of the church: the nave and the sanctuary. There is, however, another group of subsidiary spaces located to the south of the nave to consider (fig. 13 [6–8, 11, 17]. Here, the main fixed points of reference today are the remains of a staircase leading to the roof in the southwest corner of the enclosure (fig. 13 [11]) and, next to it, the traces of a thick masonry wall (fig. 13 [5]), manifest in a vertical scar on the inner face of the west wall. This wall would have run eastward, separating the nave from the south hall [fig. 13 [6]). Although both the staircase and the wall must have been substantially reconstructed, as they abut the perimeter of the building that we know to be medieval, there is a structural requirement for the existence of the dividing wall in the early church since it defines the edge of the nave and provides support for its superstructure. In 1962, the Darmstadt team also recorded the limestone emplacement for a doorway along the line of this wall (fig. 37). The location of this now destroyed door has already been discussed in the geometric analysis of the church (fig. 13), and is used in the reconstruction [fig. 13 [5]).[104] Differences in the respective threshold heights of the north and south portals (fig. 13 [9, 10] confirm that the door also marked a change in level, with the floor of the south hall being 18 centimeters (equivalent to one step) lower than the nave. To flesh out the appearance of the south hall and its dependencies when first built we must look for parallels in the surviving architecture of the White Monastery church (see plan A in fig. 9).

At the White Monastery church a dividing wall connects the west and east ends of the church, thus defining the extent of the nave and a long hall situated to its south. Large window openings in the dividing wall provide views of the nave from the hall. The hall was originally roofed with a flat timber beam construction and had a similar space above it. It had an exedra at its west end, which was connected to a large subterranean cistern, and a separate domed room (designated "library") at its east end. A staircase rises from the narthex at the west end of the nave, although it is not located in a separate room in the southwest corner of the plan as at the Red Monastery church. With the exception of the position of the staircase, the reconstruction of this area of Red Monastery church mimics this spatial distribution (fig. 13). In 1912 the Comité constructed a wall at the eastern end of the south hall separating this space from a new staircase, for which they may have utilized an existing foundation. The wall certainly fits neatly into the geometric reconstruction of the plan (fig. 11). If this were the case, it would indicate the former presence of a domed room here (fig. 13 [7]), similar to the "library" that occupies the same position in the plan of the White Monastery church. The proposed reconstruction adopts this view. It also represents the wall between the south hall and the south aisle of the church with a number of window openings. It is possible that the ceiling of the south hall in the early church was also a horizontal timber construction (fig. 17), and

102 J. Clédat, *Le monastère et la nécropole de Bawit* (Cairo, 1999), 57–59 and pl. 62; Grossmann, *Mittelalterliche Langhaus-Kuppelkirchen*, pl. 52b.

103 For al-Bağawāt, see A. Fakhry, *The Necropolis of El-Bagawat in Kharga Oasis* (Cairo, 1951), 1–2; G. Cipriano, *El-Bagawat: Un cimB itero paleocristiano nell'alto Egitto* (Todi, 2008).

104 Evers and Romero "Rotes und Weisses Kloster" (n. 7 above), pl. G. See also Grossmann, *Christliche Architektur*, pl. 155. My sincere thanks to Peter Grossmann for providing me with copies of the Darmstadt survey drawings from 1962, which were never published in their entirety.

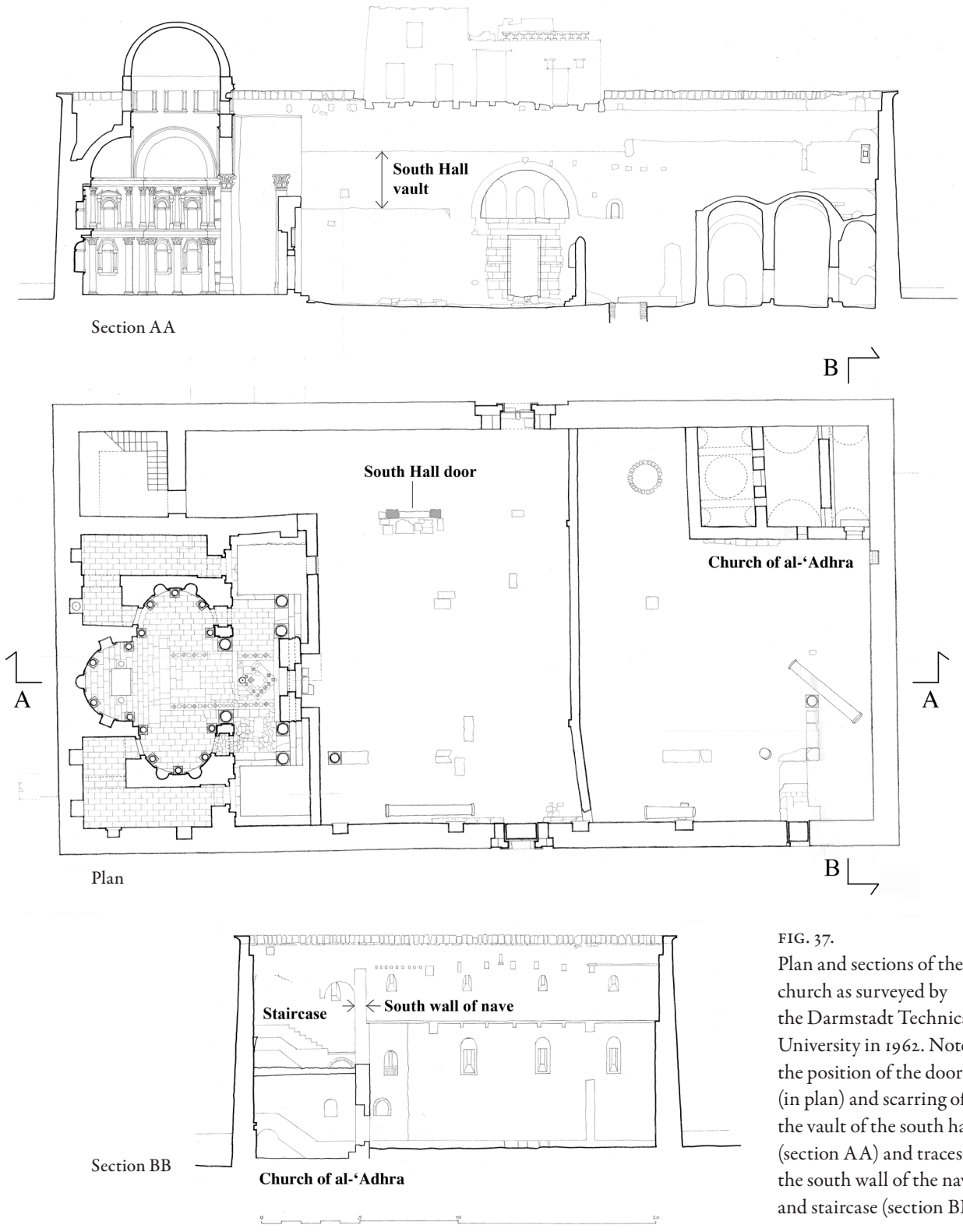


FIG. 37.
Plan and sections of the church as surveyed by the Darmstadt Technical University in 1962. Note the position of the door (in plan) and scarring of the vault of the south hall (section AA) and traces of the south wall of the nave and staircase (section BB)

that the south exterior wall had windows that provided light to the south hall. All these features are attested at the White Monastery church. Above the south hall at gallery level, the reconstruction proposes a similar spatial distribution to that on the ground floor (fig. 13 [11, 17]). The rooms probably had flat timber roofs at the same level as the other roofs around the perimeter of the nave and sanctuary.

Monneret de Villard suggested that the south hall was once the refectory of the monastery, which seems extremely unlikely.[105] László Török identifies the equivalent space in the White Monastery church as being where adult catechumens waited prior to baptism.[106] This implies a primary architectural relationship with the room to the east of the hall (designated by Török as a changing room rather than a library) and the baptistery rather than the nave itself. As there seems to have been no baptistery at the Red Monastery church, however, the question of the function of the south hall in either church remains open. The character of the space, as a sort of lateral narthex, might indicate alternative uses either as a kind of waiting room prior to entering the nave or as an area dedicated to non-canonical prayers. Such a designation would also raise the issue of just how often the main nave and sanctuary were made accessible, and to whom. Whether the room might have served for the location of devotional weaving activities by monks—an integral component of the two daily assemblies for prayer—is unknown.[107] It is possible that the space above the south hall (fig. 13 [17]) functioned as a dormitory for monks, from where they may easily have descended to participate in nocturnal services, as is the case with other monastic traditions. This hypothesis, however, remains unsupported by any textual sources and the monks could easily have lived in separate accommodation outside the church.

105 Monneret de Villard, *Les couvents près de Sohâg*, 2:119.

106 L. Török, *Transfigurations of Hellenism: Aspects of Late Antique Art in Egypt, AD 250–700* (Leiden, 2005), 158.

107 For regulations, see B. Layton, *The Canons of Our Fathers: Monastic Rules of Shenoute* (Oxford, 2014), 81–82. For a reconstruction of the spatial structure of the White Monastery, see idem, "Rules, Patterns, and the Exercise of Power in Shenoute's Monastery: The Problem of World Replacement and Identity Maintenance," *JEChrSt* 15 (2007): 47–50. The ritual of weaving also included readings, psalmody, prostration, and recitation.

The External Envelope, Cornice, and Portals

Moving to the exterior of the building, we find the absence of significant volumes of dressed stone at the archaeological site surrounding the church, a strong indication that the external envelope of the early church was built of fired brick, like its medieval successor. The fact that the north and south portals (fig. 13 [9, 10]), known to be a surviving late antique feature, are built to a slight external batter proves that the early perimeter of the church also had battered elevations. Further speculation about the detailed design of the facades is unrewarding, except with regard to the limestone cavetto cornice that presently crowns the perimeter walls of the church (fig. 13 [18]), as at the White Monastery church. Such a cavetto cornice, when combined with tapering walls, irresistibly recalls the image of an ancient Egyptian temple (even when it lacks, as in the monastic version, a torus molding). The use of the cornice, therefore, raises the question of the relationship between the modern interiors of the churches and their ancient exteriors, and the meaning of such an appropriation.[108]

There is clear evidence that the cornice blocks at the Red Monastery church are reused elements from the first church at the site. Although many blocks still preserve painted plaster on their cavettos, the plaster does not extend across the joints between individual blocks. The vertical inner face of the blocks, by contrast, preserves large unbroken areas of plaster clearly belonging to a later phase of building. Many of the cornice blocks are also chipped or otherwise damaged, and there are numerous repairs to the cornice made in brick. All these factors strongly suggest that the cavetto cornice was reinstated after a collapse. It is also possible that the exterior of the first church was entirely covered by plaster, a common treatment regardless of whether the underlying matrix was stone or brick. This would have reduced the present incongruity created by placing a stone cornice above exposed brick walls. There may have been a wish to establish a superficial resemblance with the White Monastery church.[109]

108 See discussion in Török, *Transfigurations of Hellenism*, chapter 6.2 ("Modernity and Archaizing in Shenoute's 'White Monastery' at Sohag").

109 Which may also have been plastered and painted in imitation of ashlar masonry. See E. S. Bolman et al., "Late Antique and

The two sculpted limestone portals of the church are another early feature assimilated into the second phase of construction.[110] This is confirmed not only by the style of their decoration but also by painted plaster that survives on the small stone arch above the lintel of the inner face of the north portal. This plaster corresponds in its material composition and decorative treatment to the earliest painted plaster layers found in the sanctuary.[111] The south portal is much more elaborate than its northern counterpart, indicative of its greater hierarchical importance. Perhaps this is because in antiquity, as now, most visitors approached the site from the White Monastery to the south. It will never be known if there was a similar entrance portal on the west facade. The fact that the medieval builders retained the north and south portals, which remain in relatively good condition, suggests that there never was a west portal.

The Medieval Church

The chronology and evidence presented earlier in this study suggest that the Red Monastery church, like its neighbor at the White Monastery, was substantially rebuilt in the thirteenth century—considered to be a vibrant period for Coptic Christian culture throughout Egypt.[112] Many of the churches of Old Cairo, such as Abū Sarǧa and St. Barbāra, were also heavily reconstructed at this time.[113] Elements that survive from this second phase of construction at the Red Monastery church are the fired brick external walls and the tower attached to the south enclosure wall. Those that do not survive, but which can be determined from trace evidence, are the nave roof and gallery, various modifications to the screening of the sanctuary, and the spaces to the south of the nave (the south hall and its dependencies). Although the later church appears to have adopted the overall form of its predecessor, we have no way of knowing precisely how much of the detailed design of the earlier church was kept and how much was modified to suit contemporary architectural fashion (probably originating in Cairo). An illustration of the response to these two demands can be seen in the medieval reconstruction that took place at the church at Dayr Abū Fānā, located at ancient Hermopolis (Ašmūnayn). There, the chancel arch of the sanctuary was rebuilt in pointed form with a decorated late antique cornice placed above it.[114] It is likely that builders of the medieval church at the Red Monastery adopted a similarly hybrid approach in their work. New patterns of use also had a physical manifestation, particularly with respect to screening the sanctuary.

Judging from the scale of the thirteenth-century project to rebuild the church, it seems that money was not then a problem. This was not the case when a second collapse of the superstructure of the nave occurred prior to 1737. After this later event, the church was greatly reduced in size to an area at the east end of the nave. The sanctuary was covered by a new dome[115] and further protected by a new wall. No doubt many of the materials at hand from the collapse were reused in this third phase, as is attested by the random limestone spolia incorporated in the trilobe portal at the center of this wall. This phase will not be discussed further as it has no architectural relevance to the reconstruction of the form of the church in either the fifth/sixth centuries or the thirteenth century. It was, however, crucial to the survival of the sanctuary and its paintings into the beginning of the last century. The following description of the second phase of the building follows the same sequence employed in the earlier account of the late antique structure, starting with the nave.

The Nave

One assumption about the nave in its rebuilt form is that its columns were reset in their original locations. This is supported by the fact that the beam holes for the floor of the gallery are at the correct height relative to a complete column assembly. It is quite possible that not all the columns collapsed: those that survive in

Medieval Painted Decoration at the White Monastery (Dayr al-Abiad), Sohag," *Bulletin of the American Research Center in Egypt* 192 (2007): 8; Clarke, *Christian Antiquities*, 151.

110 For a description of the portals see Kinney, "Architectural Sculpture" (n. 3 above), 88–91.

111 De Cesaris, Sucato, and Ricchi, "Wall Painting Conservation," 270; Poggi, "Pigment and Plaster Analysis," 24–26 (both n. 18 above).

112 T. K. Thomas, "The Arts of Christian Communities in the Medieval Near East" in *Byzantium: Faith and Power (1261–1557)*, ed. H. C. Evans (New Haven, 2004), 417.

113 See Sheehan, *Babylon of Egypt* (n. 60 above), 105–6.

114 See Kinney, "Type" (n. 12 above), 44 and fig. 5.11.

115 Archival photographs show that the base of the dome that was removed in 1909 was so haphazardly built that it was unlikely to have been part of the presumed thirteenth-century restoration, which must have utilized a much higher level of craftsmanship.

situ at the east end appear not to have been displaced although this is difficult to establish with certitude. In this regard, an observation provided by the German antiquarian and linguist Johann Michael Wansleben (1635–1679) is significant. Wansleben visited the church in 1673, after the presumed second collapse of the roof, and found a collection of columns still upright in the nave complete with their capitals.[116] The volume of rubble in the vicinity of the church at the time of its earlier rebuilding must, however, have been very considerable and may account for one curious feature at the west end of the north aisle. This is a blocked door with a pointed arch, which once gave access to the outside. The door has a threshold 70 centimeters above the floor of the nave and is approached by a stepped platform from within. This platform is built directly over earlier paving and a stone bench that once ran around the edges of all the church's aisles (fig. 16). The raised level of this door can best be explained by the fact that when the rebuilding of the church took place, the exterior ground level (at least to the north) must have risen since the time of the church's foundation, requiring the construction of a new access at the higher level.[117] It may also have been the case that this new door functionally replaced the north portal, which was blocked (as shown on the north–south section in fig. 38).

As far as the gallery above the aisles of the nave is concerned, the surviving beam holes give us a clear idea of the location of the timber structure of the gallery and the roof above it. As with the late antique church, however, the nature of the edge treatment of the gallery facing the nave is uncertain. Was there a faithful reconstruction of what had gone before or was a new design adopted for reasons of economy or taste? Comparison with contemporary church restorations may offer the only plausible answer to this question. In churches such as Abū Sarǧa and St. Barbāra the edges of the galleries have a combination of small reused antique columns and masonry piers. The reconstructed sections propose the same hybrid arrangement for the Red Monastery church (fig. 38). Similar uncertainties surround the existence of a clerestory above the gallery and the design of the structure of the nave roof. Surviving medieval timber roofs in Egypt are just as rare as late antique ones. The church of Abū Sarǧa may be the earliest example. It has a complex semicircular truss roof, parts of which are thought to date to the thirteenth century.[118] Such a roof is described in texts of the period as an inverted model of Noah's ark, a form chosen for its connotation of salvation.[119] Such barrel-shaped roofs have now become part of the standard iconography of the Coptic church. Older wooden examples demonstrate the advantage that they can be built from small sections of timber used in a "sandwich" method of truss construction, obviating the requirement for importing large balks. The roof over the nave at Abū Sarǧa is not raised above a clerestory, but stands only slightly higher than the surrounding flat roof.[120] It may well be the case that a similar system was employed for the roof of the restored church at Sūhāǧ, as shown in the reconstruction presented here (figs. 38 and 39).

The East End of the Nave

If a clerestory was omitted and the line of the bottom chord of the roof trusses was dropped in the medieval rebuilding of the church, following parallels from Cairo, this would have had major consequences for the appearance of the east end of the nave. The shift would place the high-level niche on axis in the sanctuary facade above the level of the trusses, and challenge the original relationship between the sanctuary facade and the columns standing in front of it. There is, fortunately, one small piece of evidence that may help us to reconstruct the situation. This is the presence of two medieval Coptic inscriptions in the same hand, revealed only by recent conservation, on the hood and pediment of the central high-level niche in the sanctuary facade (visible in fig. 19).[121] Given the vertiginous location of this niche, it is likely that the author of these inscriptions—"the wretched Merkoure"—stood on a roof while leaving his mark. This means that when the church was rebuilt, the east gable of the nave roof was located directly above the columns on the western border of the bema at ground level, leaving a small

116 Vansleb, *Nouvelle relation* (n. 37 above), 376–77.

117 I am grateful to Michael Jones for this observation.

118 Sheehan, *Babylon of Egypt* (n. 60 above), 108 and fig. 71.

119 See E. S. Bolman, "Theodore, 'the Writer of Life,' and the Program of 1232/1233," in *Monastic Visions: Wall Paintings in the Monastery of St. Antony at the Red Sea,* ed. E. S. Bolman (New Haven, 2002), 57.

120 See Sheehan, *Babylon of Egypt*, fig. 41, for a representation of this arrangement.

121 Recorded for the first time by Dilley, "Inscriptions" (n. 21 above), 297 (F.III.3.i-1 and F.III.3.i-2).

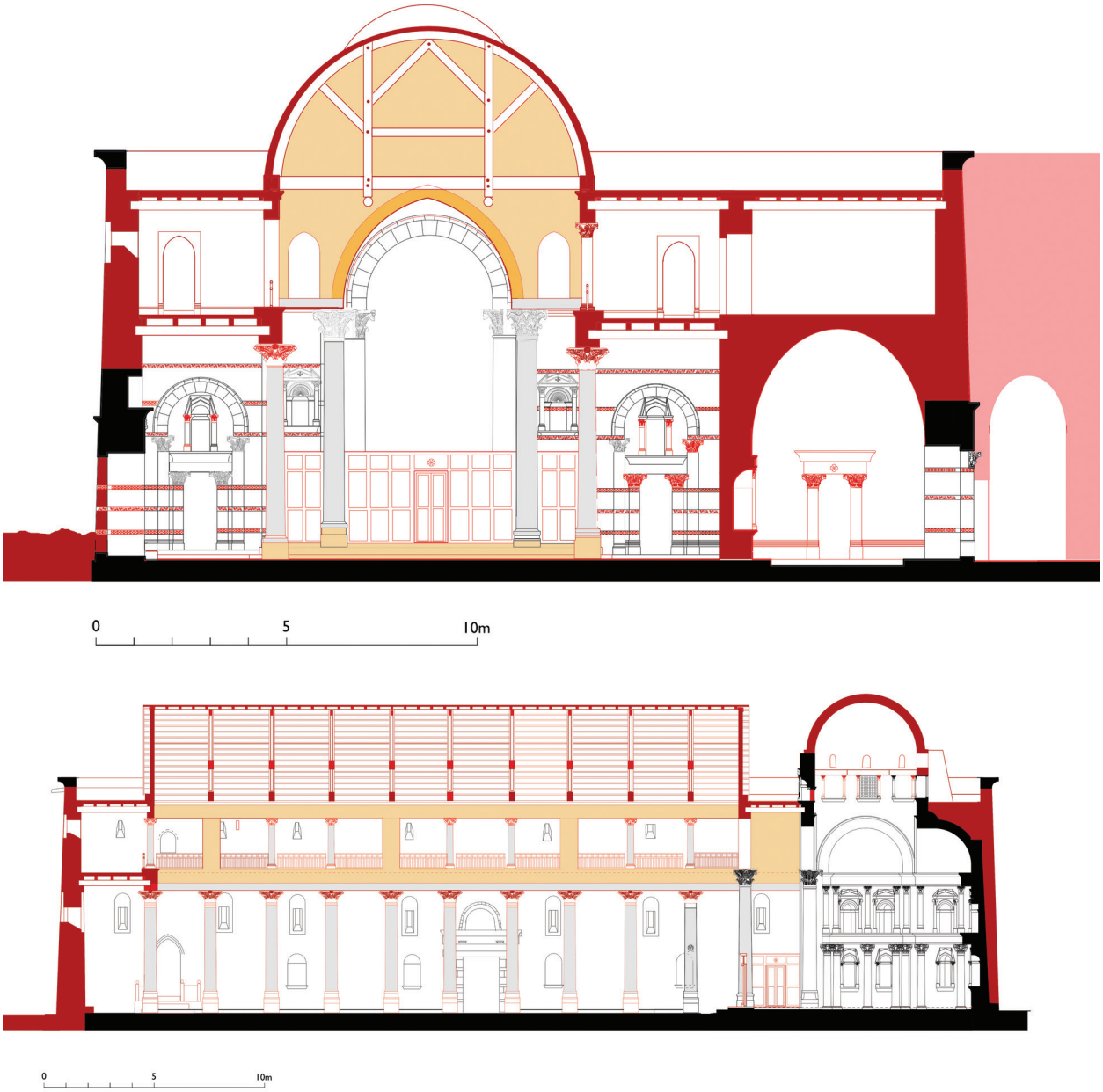


FIG. 38. Reconstructed sections through the medieval church. Top: north–south section looking east through the nave and south hall showing barrel roof; bottom: west–east section looking north through the nave showing gallery arcades with piers and columns, no clerestory, and replacement dome over triconch (drawing: author, 2016)

FIG. 39.
Perspective view of reconstructed nave of Red Monastery church in the medieval period looking east, showing barrel vaulted roof without clerestory and pointed arch over columns on edge of bema (drawing: author, 2016)

area of flat roof between it and the sanctuary facade. Peter Grossmann proposed this arrangement in 2006 (fig. 24), but related it to the late antique church. I would argue for its validity in the church's later incarnation. The implication is that a wall supporting the gable end of the roof rose above the large columns in front of the sanctuary facade. This was probably lightened by means of a large arch. This arch is shown as pointed in the perspective reconstruction, in keeping with the architectural style of the period (fig. 39).

Screening the Sanctuary

I have proposed that the bema in front of the sanctuary was screened with *cancelli* in the early church and

that there was no access to the bema from its sides at this time. Grooves cut into the sanctuary facade to a height of 2.25 meters strongly suggest that tall wooden screens were introduced in the medieval period in place of these *cancelli*, removing the altar from plain sight. Although there are no marks on the columns *in antis* at a higher level to suggest that such tall screens were fixed directly into these columns, it would have been possible to achieve structural stability for any screen by using curved metal bands to encircle the shafts. Two ghostly painted figures, representing the Virgin Mary and Christ and attributable to the medieval period, still decorate the surface of the two central shafts facing the nave.[122] These figures correspond with the overall height of a screen standing 2.25 meters high and may be considered in association with such a structure (fig. 29, right).

Proof for another change being made to the early church to accommodate a new pattern of use can be seen in the return alignments of the screen at the north and south edges of the bema. Here, the location of the postholes for the screen, at the extreme edges of a step cut into the monolithic limestone border of the bema, clearly suggests that the blocks were modified in situ to create an additional step. This changed the position of the postholes from being at the center of a flat block to the outer edge of a stepped block. The alteration represents a shift in usage from no direct access to the sanctuary from the sides of the bema (with solid *cancelli* and no steps), to full access (with steps and opening doors in a high screen). Such physical changes were probably made in response to new liturgical criteria. Of relevance here is the fact that the liturgy practiced in the late antique church is believed to have become defunct by around 1000.[123]

The evidence for screens in front of the sanctuary is not limited, however, to the screen around the bema. Beam holes on the inner pair of pilasters flanking the large granite columns of the chancel arch (and one surviving posthole below the northern pilaster) indicate that a timber screen was also installed below the chancel arch. The granite and limestone bases of the columns supporting the arch were even trimmed back to accommodate this screen, which stood to a height of 2.45 meters—marginally taller than the screen that bordered the bema (fig. 29, right). To either side of this screen are door openings leading to the north and south conches of the sanctuary. There is evidence of sockets for pivoting doors in these locations, which were probably installed in tandem with the complete screening of the inner sanctuary from the bema. The decision to make this separation is also reflected in a now-lost treatment for the floor of the bema. Drawings published by Monneret de Villard in 1926[124] and a plan made by the Darmstadt Technical University in 1962 indicate that the bema, and part of the sanctuary itself, had a floor made of *opus sectile* (see plans in figs. 28 and 37). Somers Clarke described this floor, which was sadly destroyed in the 1980s, as being made of "small squares of dark granite and basalt, inlaid upon bands of white marble."[125] The floor had two clear zones of decoration, reflecting a spatial division between the bema and the sanctuary that would have been reinforced by the screen. The rotated square pattern visible on its western side may also have demarcated an area of special activity, such as the site of readings.[126]

I have elsewhere suggested that the screen under the chancel arch leading to the sanctuary may have been introduced sometime after the screens around the edge of the bema.[127] Reconsideration of the question, however, leads to an alternative theory—that all of the screens described above as well as the decorative floor were installed in a single operation when the church was restored in the thirteenth century. This would have created an entirely separate space on the platform in front of the sanctuary, to which access was restricted: the equivalent of a *khurus*, known to have been a standard component of Egyptian church design since the seventh century.[128]

The Triconch and Its Side Rooms

No architectural interventions dating from the medieval period are visible in the triconch today. The floor

122 For details of these figural paintings see Bolman, "Medieval Flourishing" (n. 23 above), 204, 209.

123 See Zanetti and Davis, "Liturgy and Ritual Practice" (n. 11 above), 27.

124 Monneret de Villard, *Les couvents près de Sohâg,* 2: pl. 126.

125 Clarke, *Christian Antiquities*, 169. A number of fragments of this floor, corresponding to Clarke's description, were rediscovered in 2014 and placed in storage inside the church.

126 I thank Father Emmanuel Fritsch for this suggestion.

127 Warner, "Architectural Survey" (n. 12 above), 63 and fig. 6.19.

128 For the *khurus*, see P. Grossmann, "Architectural Elements of Churches: Khūrus," *Coptic Encyclopedia*, 1:212–13.

and the roof would have been the most likely areas for such interventions, but both have been replaced in modern times—the floor in the 1980s and the roof in 1909. Documentation of the *opus sectile* floor does, however, provide tangential evidence in the layout of its stonework for the location of a centralized altar within the sanctuary, perhaps demonstrating continuity with its late antique predecessor (fig. 28). Two surviving limestone bases with inset circular reveals for column emplacements, reused in another context, also provide scanty archeological proof for the existence of a medieval ciborium over the altar.[129] It is likely that the thirteenth-century restoration of the roof of the sanctuary included a new dome. If this resembled the domes constructed in this period that survive over the sanctuary of the White Monastery church, it may have had an octagonal zone of transition with squinches and small windows (fig. 38). To accompany this intervention, earlier windows in the sanctuary clerestory may have been blocked and buttresses added for structural reasons. New roofs over the long side chambers to the north and south of the triconch were, of necessity, also part of the thirteenth-century program of restoration. They were probably made of vaulted brick. Today, an elliptical inclined brick vault stands above the north long chamber. The fact that it is laid with silt mortar rather than lime must be evidence for a later phase of repair. Its counterpart vault to the south dates to 1909.

The South Hall and Its Dependencies

Returning to the area of the south hall of the church and its related spaces, the only evidence for any original spatial organization that survives is that imprinted on the brickwork of the inner faces of the south and west enclosure walls. All material evidence of the wall that once separated the nave from the south hall has vanished, most probably reused by the builders of the village houses that filled the nave in the nineteenth century. As has been demonstrated, at least one doorway existed in the wall (fig. 37). It may also have had windows that would have directed borrowed light from the nave into the otherwise dark space of the south hall. In the medieval period there were no window openings in the south facade to illuminate the interior of the hall, only blank niches. The traces of a series of pitched vaults belonging to the stair can be seen on the masonry of the west wall. These vaults would almost certainly have extended up to the roof. Also visible on the west wall is a long vertical scar that represents the south wall of the nave. The Church of the Virgin, built at an unknown date in the southwest angle of the enclosure, follows the line of this wall extending east.

The absence of beam holes and the presence of masonry scarring on the inner face of the south enclosure wall indicate that a continuous brick vault, running in an east–west direction, covered the entire south hall (fig. 37). The vault may well have been constructed using inclined courses of bricks following an elliptical profile to forego the need for timber centering (fig. 38). The springing of such a vault survives over the narthex of the White Monastery church. Also at the White Monastery church a completely separate brick vaulted construction was inserted into the south hall, presumably because it was easier to build an independent structure here than to modify the original. Shortages in the supply of timber and its resultant high cost usually dictated such shifts from timber to masonry construction. By way of precedent, the destruction of timber roofs in churches in Cairo and their replacement with masonry structures has been documented from the 1160s.[130]

As indicated in the preceding discussion of the late antique church at the Red Monastery, the west end of the south hall may have been apsidal, in imitation of the White Monastery church. There are, however, no physical signs to confirm this. To the west of this presumed exedra, a disruption in the scarring on the south wall suggests the presence of another room, taking up the interval between the end of the exedra and the staircase. Such a space could have been accessed from the staircase, as is shown in the reconstructed plans in figure 13 through the exedra, or directly from the southern aisle of the nave. A room was also located at the opposite end of the south hall, where the Comité constructed a new staircase in 1909–1912. It is assumed, as was the case for the early church, that for structural, if no other, reasons the distribution of rooms at first floor level replicated that found at ground.

129 G. Pyke, "Red Monastery 2013: Archaeological Report," unpublished report submitted to the American Research Center in Egypt.

130 Summarized by C. R. Peers, "The White Monastery near Sohag," *Archaeological Journal* 61 (1904): 143. See also Clarke, *Christian Antiquities*, 129; Creswell, *Early Muslim Architecture,* 2:116.

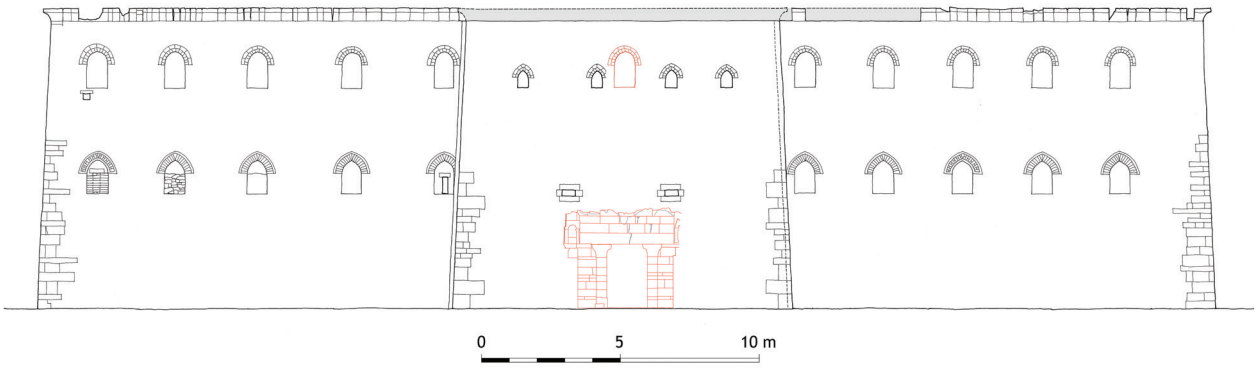


FIG. 40. South elevation of the Red Monastery church showing tower with reconstructed cornice (gray tone) and location of features concealed by tower (red line) (drawing: author, 2014)

The External Envelope and Tower

The most important elements of the early church that provided the nucleus around which rebuilding took place are obviously the sanctuary itself and its facade. Given the seamless nature of the brickwork on the east and north elevations of the enclosure wall, it must be assumed that the existing structure of the sanctuary was refaced on its east side, and that new junctions were created with the remains of the side chambers. The articulation of the facades of the enclosure wall has been explained elsewhere.[131] It should be emphasized that the most elaborate brickwork is to be found on the south elevation, which faced the majority of visitors arriving from the White Monastery. This mirrors the hierarchical importance placed on the south portal in the late antique period.

One major new element was added to the church in the medieval period: the tower on its south side. The construction of the walls of the church and the tower correspond so closely in technique as to suggest the latter was built not long after the former. This is visible not only in the identical quality of its brickwork, but also in the treatment of all corners with quoins of limestone masonry. The symmetrical placement of the tower in relationship to the south facade of the building corroborates this impression, although the tower completely concealed certain features of the facade such as the late antique south portal and a high-level blank window above it (fig. 40).[132] This building of the tower may well have been a response to the recorded rise in the persecution of Christians in Egypt during the late thirteenth century. If the main body of the church was completed in around 1259 (corresponding to the date of the conclusion of the White Monastery church restoration), then the tower might have been built twenty years later.

The limestone cornice blocks that survived from the early church were replaced above the new brick enclosure walls and may even have continued around the top of the tower, thereby unifying the architectural composition. An archival photograph taken by Wladimir de Bock in 1898 implies this arrangement, as does the very formal placement of the tower (fig. 41). None of these blocks remain in situ on the tower today. The reinstatement of the church's cavetto cornice above the rebuilt perimeter walls of the church can be interpreted only as the fulfilment of a strong desire to maintain the symbolically charged silhouette of a long-discontinued architectural form many centuries after its initial deployment.

Conclusion

The detailed study of the architecture of the Red Monastery church presented here, enabled by a conservation project lasting more than a decade, has led to a number of conclusions about the evolution of the complex on both a macro and micro level. Documentation of the fabric has shown that after its foundation in ca. 600

131 Warner, "Architectural Surve" (n. 12 above), 50–53 and fig. 6.5.

132 The brickwork supporting the entrance area vault of the tower was removed only in 1912.

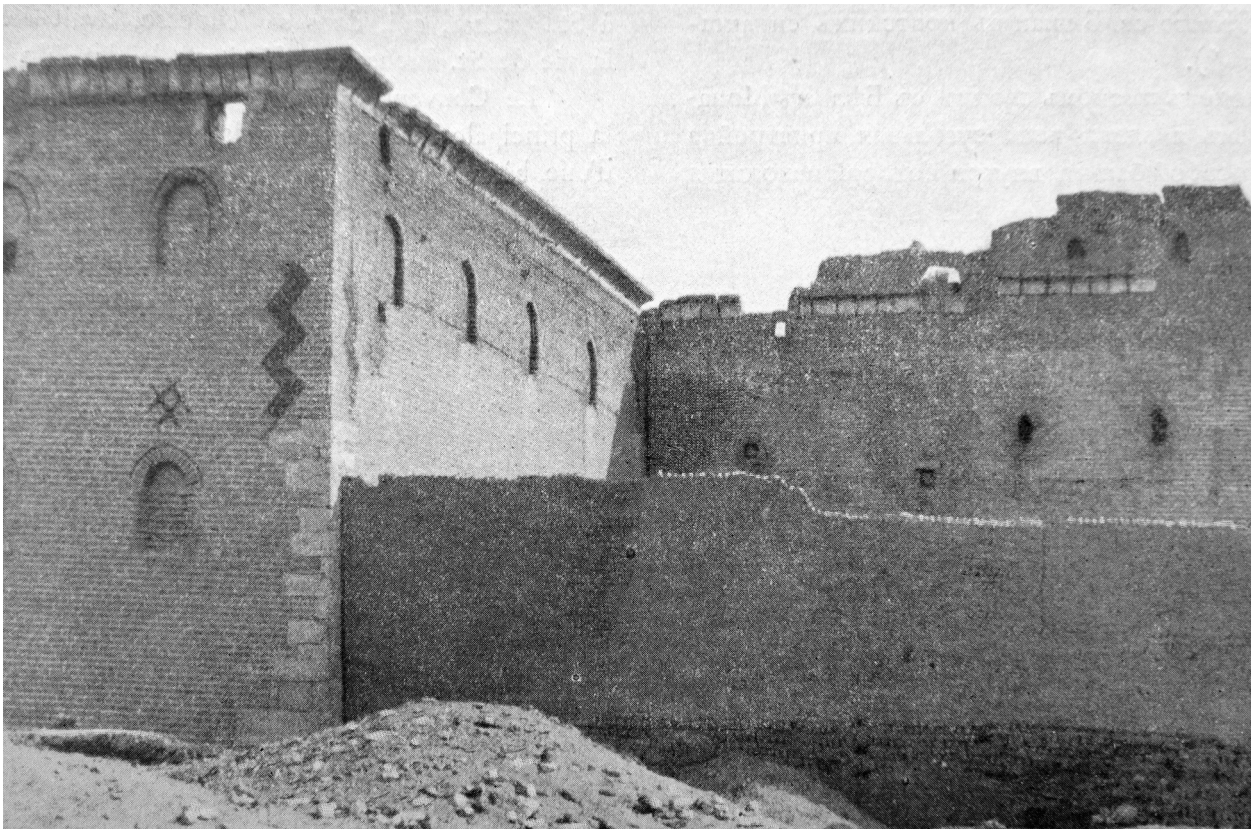


FIG. 41. View from southwest of the Red Monastery church enclosure wall and junction with the tower, 1897–98, showing continuation of cornice blocks above tower and decorative effects in the brickwork of the southwest corner (photo: Wladimir de Bock, from *Matériaux*, fig. 72)

the church was significantly damaged—most probably by an earthquake—and subsequently reconstructed between the tenth and thirteenth centuries. This rebuilding is signaled not only by the use of new architectural elements derived from the Dār al-Islām, but also by the analysis of the plaster and paintings on the walls of the nave. The extensive restoration work at the White Monastery church, securely dated to the mid-thirteenth century, may well have been contemporaneous with this project.

The study also demonstrates that the reconstructed church was generally respectful of the design of its antecedent, reutilizing a coherent proportioning system that had originally determined the placement of major internal structural elements in both plan and elevation. The rebuilders of the church even replaced the original cavetto cornice around its perimeter, thus retaining the building's distinctive silhouette. This provided an external visual link with not only the church's immediate architectural progenitor at the neighboring White Monastery but also the inheritance of ancient Egypt. During this period of reconstruction, a tower was also built on the southern flank of the church to a design that was carefully related to the church's enclosure walls.

A reevaluation of the sanctuary facade and the columns standing on the edge of the bema in front of it has resulted in new insights into the relationship between these key elements in the late antique period. A similar reappraisal of the form of the roof, over both the nave and the sanctuary, has queried the prevalent assumptions that there was never a clerestory in the nave and that the soffit of the sanctuary was flat. The position of an internal high-level niche on the sanctuary facade indicates that it must have been a significant focus of the nave, and provides evidence for the construction of a clerestory. The method of roofing employed over the

sanctuary will, almost certainly, never be known, but the full range of the alternatives available at the time is here surveyed.

The study has also traced the medieval period changes to the fabric of the building that occurred not only as a result of physical factors but also in response to shifts in religious practice. Of particular significance is a reinterpretation of the design of the east end of the nave in the light of new epigraphic and physical evidence. As far as the evolution of the liturgy is concerned, the height and location of screens around the sanctuary and the probable creation of a *khurus* in the medieval period point the way to a better grasp of this subject, particularly given the absence of textual evidence for the building's history.

At the end of 2015, a further project to conserve the structure and paintings of the nave of the church was launched. It is hoped that this work will soon yield additional information of relevance to the history and physical appearance of the structure through time, and thus increase our understanding of what this church, one of the most remarkable survivals of late antique architecture in Egypt, may have looked like in its full complexity.

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